

McGRAW-HILL HOME ECONOMICS SERIES

ANNIE LOUISE MACLEOD, Ph.D., CONSULTING EDITOR

THE DEVELOPMENT OF LEARNING  
IN YOUNG CHILDREN

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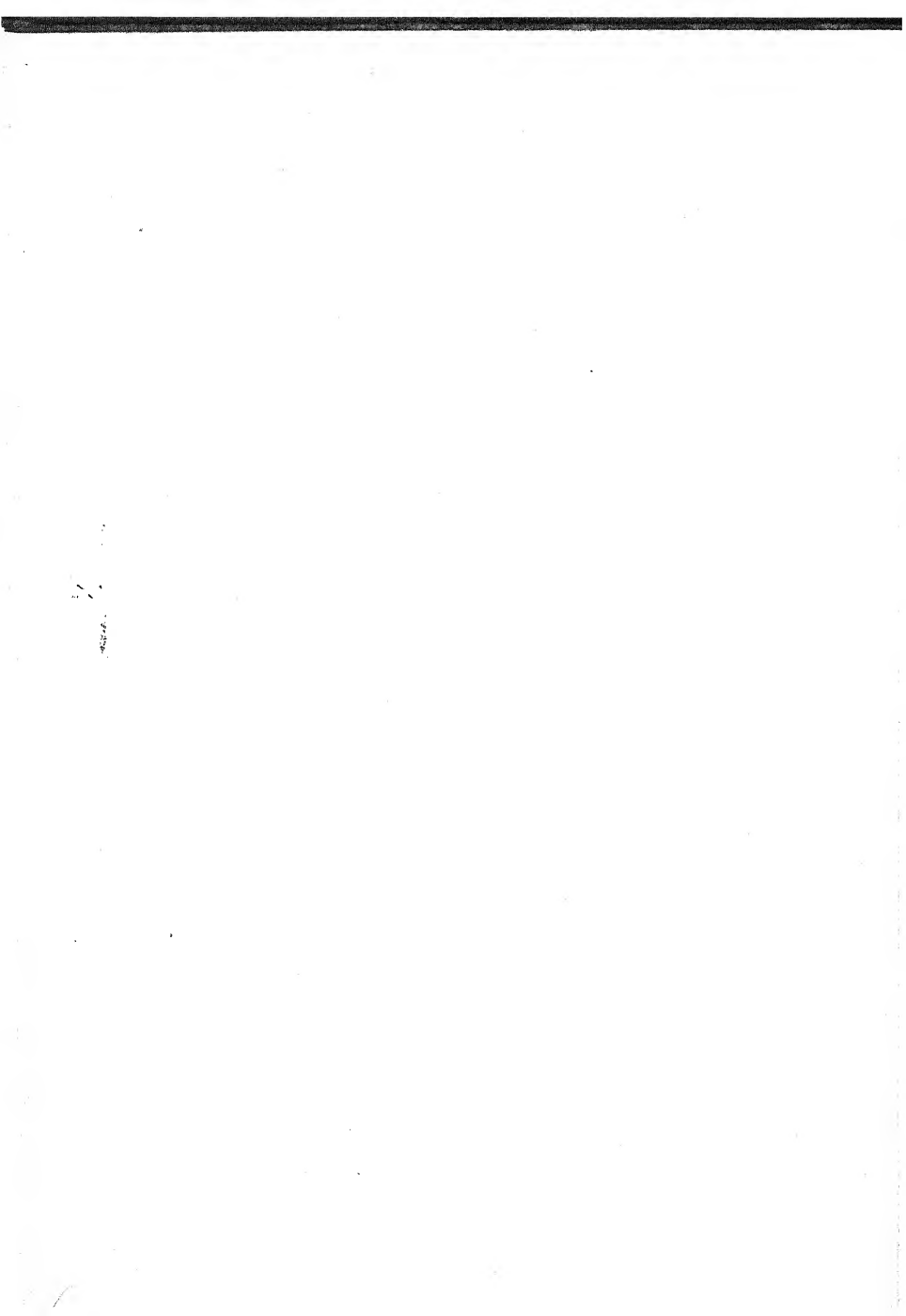
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*(Frontispiece)*

The child needs wholesome activity.

# THE DEVELOPMENT OF LEARNING IN YOUNG CHILDREN

BY  
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Mills College*

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## PREFACE

The idea of development in learning grows out of the notion that the immature individual progresses toward maturity. It has been the aim of the writer to present some of the steps by means of which the child acquires the skills and methods of response which will enable him to function satisfactorily in collaboration with other human beings.

Emphasis is placed upon *learning* rather than upon *training*, because the response of the growing organism is regarded as a dynamic element which makes acquisition of skill and knowledge possible.

An introduction to a study of the ways in which children learn is offered by a description of animal learning in order to show these methods and processes in simplified form and to make the steps in learning obvious. Such simplification has its own dangers. There is of course no perfect parallel between animal and child learning. Laboratory teaching of animals offers the very great advantage of controlled conditions but by its very abstraction from everyday living offers less comparable illustration. Children in daily living, however, are subjected to learning situations which are but little controlled in the laboratory sense.

This introductory comparison of human and animal learning is followed by illustrations of child learning drawn for the most part from nursery school situations. The discussion is, therefore, largely limited to the early years of childhood. In order that the starting point of development may be made clear, a description of fetal and early infant learning is included.

Inquiry with regard to situations and equipment that will most easily arouse the desired response follows upon a knowledge of what responses are of most worth. Any discussion of developing attitudes and skills involves a consideration of the question: When is a child ready to be taught or to learn given skills and to acquire certain attitudes? Present knowledge of both these aspects is unfortunately too meager and inadequate to permit complete answer.

This ignorance on the part of parents and teachers may lead to a failure in realization of the fact that inexpert behavior is inherent in immaturity. It is possible to become so deeply concerned over the development of unfortunate traits that behavior which is to be expected in young children is regarded as presenting incipient "problems." A more wholesome attitude would regard these deficiencies as phases of immaturity which will be eliminated through normal development.

The young child needs such training and such opportunities for growth that these inevitable phases of development which may appear as problems shall fade out instead of developing into exaggerated forms. With growing expertness on the part of the teacher, problems disappear. It is astonishing that undesirable attitudes should begin to appear so very early in life. Yet it all too frequently happens that even a two-year-old child must unlearn as well as learn.

The prevention and cure of undesirable traits lie in the opportunity for learning. Therefore the present discussion deals not with corrective measures but with the development of learning. It seems important not only to offer warnings—"discussion of what not to do" as one parent expressed it—but to consider also the processes by means of which skills and attitudes develop so that the parent or teacher or student may be able to decide for himself what the desirable procedures may be with reference to a particular child.

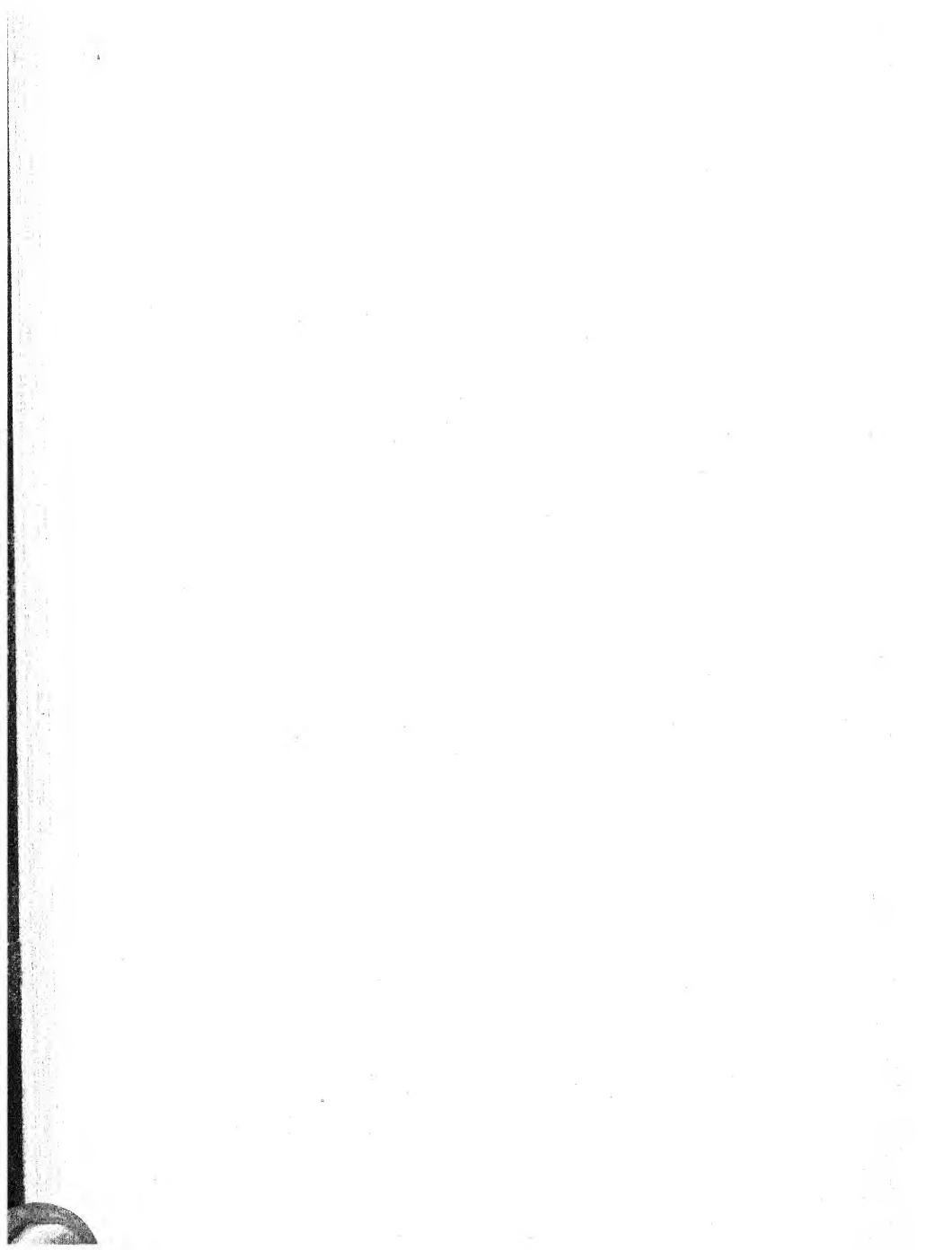
The methods of learning as set forth by Woodworth, Washburn, and Stevenson Smith are followed in the discussion, rather than the so-called laws of learning of educational psychology. In this way the actual processes by means of which control develops may be more clearly described. The writer wishes to express her indebtedness to these authors and to many others from whom she has frequently quoted and to whose work reference has often been made. She is indebted also to Dr. Hazel M. Cushing, who read the manuscript, and to Miss Isabella S. Hammack for help in preparing the manuscript for publication.

A very timid young woman, who later became famous as an author, used to bow at each street corner whether or not anyone was in sight, thereby discharging the offices of politeness for that

block. The present writer has something of the same feeling that there are many obligations which it would be difficult to discharge directly but which should be acknowledged completely and with gratitude.

LOVISA C. WAGONER.

MILLS COLLEGE, CALIFORNIA,  
*December, 1932.*





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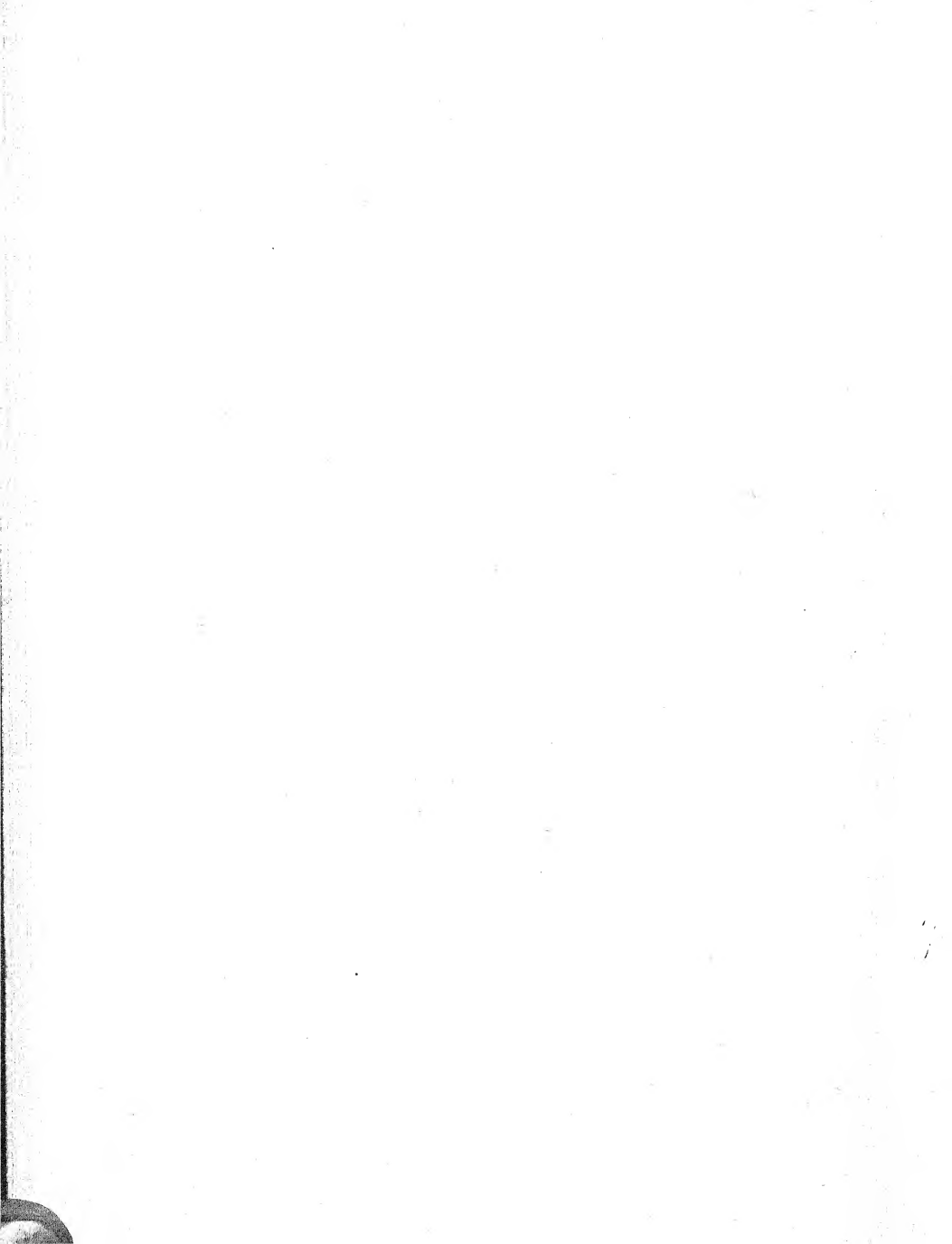
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# THE DEVELOPMENT OF LEARNING IN YOUNG CHILDREN

## CHAPTER I

### METHODS OF ANIMAL LEARNING

The casual observer who has paid little attention to children except when they are noisy enough to be disturbing or pleasing enough in appearance to arouse a momentary aesthetic appreciation may regard the young of the human species with the amused tolerance given to a mischievous and not too destructive puppy or with something of the same annoyance as that caused by the inexperienced crowing of the young rooster.

That puppy and rooster, and child as well, are becoming full-grown animals is, for the casual observer, but little extenuation for their inferior type of behavior. The notion that dog and rooster and child in their growth and development must try their powers, must through practice master the attainments that seem necessary for the mature individual, completely changes viewpoint and attitude and arouses interest in this process of becoming an adult.

Not only is the child at every stage of his development proceeding toward maturity, he is at the same time a functioning individual, perfect *as he is* for the stage in which he finds himself. He is important both for what he now is and for what he will become. The child's behavior, attitude, interests are, therefore, both ends and means.

All the while that he is growing up the child is learning, for learning is not dependent upon explicit teaching. It sometimes seems that he learns more fully and readily when, in the absence of direct teaching, the situation alone occupies his attention.

His response, being spontaneous and unguided, stands or falls in terms of its own efficacy. The hotel child becomes expert in knowing how to serve his own ends. He picks up, from his surroundings and the people who notice him, a skill which enables him to get the best of what otherwise would be an uninteresting sort of life.<sup>1\*</sup>

In the life of any baby the steps by which learning proceeds do not follow in a single line. Learning goes on in many fields at the same time; these learnings both aid and interfere with one another. The little baby is learning to control his own body, to understand something about the world in which he lives, to manage that world, to communicate his needs and emotions—all these in concert.

Because learning goes on in so many fields simultaneously, with mutual hindrances and aids, it is necessary to simplify matters exceedingly if any discussion of the method of learning is to be intelligible. Since all cannot be considered at once, each phase of learning must be discussed separately as though these learnings followed one another rather than occur together. While this one-dimensional discussion fails to present the matter in the round, it makes possible a study of the stages leading to adult development.

### THE LEARNING OF ANIMALS

The discussion of human learning may be illustrated by the learning of animals. The ways in which animals learn are to be observed not only in the laboratory but also in other places and situations. Because animal learning is simpler and less extensive and involves fewer factors than human learning, it presents a sort of skeleton upon which the more complicated features of human learning may be draped. A study of animal learning may increase insight into the methods by which the little child acquires the knowledge and skill which will enable him to function in his own world and, when the time comes, to function as an adult.

This learning of animals is in itself an interesting matter. Anyone who has watched a cat or a kitten knows that even kittens have to be taught the ways of the world, at least of catdom. A

\* Superior numerals refer to the References to be found at the end of each chapter.

mother cat will cuff her child when that infant is too persistent in wanting to nurse when he should be learning to find his own food. The essential difference between kitten and cat is not size but rather a facility and expertness in response added by experience.

Martin Johnson describes the teaching of two young elephants who "were toddling, bumping up against their mothers, and stopping and turning around just like children on a street." Every now and then a mother turned around and slapped her offspring with her trunk. The little fellow would squeal and then trot along obediently again.<sup>2</sup>

It is the playfulness of the kitten which makes it possible for him to learn. This bounding, rolling, jumping, wiggling ball of fur through all these movements is learning how to manage himself in an unknown world. It is this tendency to activity which makes learning possible for animal and for human being. Sensitive to stimuli, the living creature responds to these stimuli. This capacity of the nervous system to respond to the outside world and to retain traces of that response lies at the basis of all learning.

The playful kitten who cannot resist following the ball moving across the floor, the puppy that worries his master's slipper, do so because they respond spontaneously to the world in which they find themselves. It is on the basis of such responses that definite skills are built up. Random movements are the raw materials out of which definite, complicated acts are made, since they serve as the basis for coordinations.

The dog Zip was being taught to beg. He would first run toward the hand that held the food, then whine and run away frisking. A second offer would sometimes call forth a yelp and a clawing with front feet while the head was raised in appeal. Then in his eagerness to seize the food he would lift his front paws and rise on his hind feet. Unfortunately he found it difficult to hold that position. Many times did he try before he could hold himself upright long enough to satisfy his master's demands. Even the upright position alone was not enough but must have a yelp added before his trick was acceptable.

A pet squirrel had learned to come to the front of his cage when nuts were offered him. Even when no food was available he ran around his cage, but this aimless running was turned in a

certain direction by the food stimulus. The squirrel was particularly fond of pecans, and every time he was offered them the cage was tapped three times. Finally this signal became so effective that whenever he got out of his cage he could be coaxed back by the tapping.

### THE TEACHING OF ANIMALS

This learning of animals proceeds according to certain laws or principles; that is, learning is an orderly process, not a haphazard, catch-as-catch-can affair. Response to stimuli provided by the animal's body and by his surroundings makes learning possible. If the trainer makes use of certain aids to learning, the integration of these responses is greatly facilitated. These principles may be summarized as follows: Learning is dependent upon spontaneous activity; exceptions cannot be permitted to occur; the total situation must be unvaried. Failure to observe these laws or principles of learning interferes with development of the desired sequence or retains undesirable responses. Observance of these laws increases the certainty of learning, increases the effectiveness of teaching.

**Spontaneous Activity.**—The tendency to pursue a moving object, which gives zest to the kitten's amusing occupation of running after his own tail, is characteristic of most young animals. Because young animals are actively responding to the outside world and to the stimuli which arise from their own bodies, they are able to learn. Tricks are not learned as entirely new procedures. The kernel is a spontaneous performance which is elaborated through training.

Animal trainers say that the initial step of any trick must come spontaneously.<sup>3</sup> In their play two lions will box each other, fighting, growling, fur flying. The trainer simply makes their play a part of the show. Another animal loves to climb and to balance himself on the rails of the arena—he becomes a "tight-rope-walking tiger." The random movement is attached to a given situation and is connected with other movements until finally the complicated trick or performance is built up. To encourage movements which may be developed into a spectacular performance the trainer introduces into cage or arena pieces of apparatus which will encourage striking responses. For example,



at the very bottom of the elephant trick with tubs, lies the tub which is casually placed within the elephant's range. When one foot of the investigating animal is put on the upturned tub, his act begins.<sup>4</sup>

A leopard is encouraged to walk over a stick laid on the floor. "He is led over it again and again and fails to notice that each time the stick is raised a little from the floor." Somewhat to his surprise and discomfiture, he finds that "he has to make quite a spring in order to get over it at all." When the incident is finished, he is jumping over a stick that is raised as high as a chair.<sup>5</sup> The skill of the trainer shows itself in the combining of random movements, the positive conditioning of the animal to the apparatus which serves as a cue to call forth the desired behavior, and in combining through association a series of separate responses.

The cat learns to sit up and beg because its eagerness for the tidbit causes it to elongate its body in the direction of the delectable odor. Conklin, the lion tamer, noticed that one of his lions showed a tendency to pay attention to the band and to move around while it was playing. This spontaneous behavior was encouraged until it developed into a feature of the act. While the rest of the lions sat in a row, this particular one followed Conklin with a sort of waltzing movement, in time to a certain waltz.<sup>6</sup>

**No Exceptions Permitted.**—Animal trainers tell us further that in teaching an animal no exception must be allowed to occur. When the stimuli for a given act are presented, the act must invariably be performed. No exceptions, no backsliding can be overlooked. To follow the advice of Rip Van Winkle would be to succeed as did Rip in building up another habit.

At every practice period, everything must be done in exactly the same way. This requires endless patience and skill. Trainers say that on occasion it takes hours to persuade an animal to do something that he is reluctant to do. Yet if the act is to be mastered, the trainer must see that it is done properly. Prompt obedience must be secured not only when the animal is learning his act but at all times. When an animal has been taught to go to a certain place he must learn to stay there until he has his cue to leave. For a lion to remain on his pedestal not only makes

possible a complicated act but may insure the trainer's life, since very few beasts will spring from a pedestal. Absolute obedience is essential, lest an animal discover its own power.<sup>7</sup> After a time the animal becomes so accustomed to performing that when he sees the paraphernalia of his performance he knows exactly what is expected of him and does as he is expected to do.

**Total Situation Constant.**—A third principle of animal learning is that the total situation must remain constant. Any change in detail by altering the stimulus may prevent the occurrence of the desired response. One of the usual acts in a circus is that of a horse trained to lie down while the ringmaster stands on his side. On one occasion when a green hand tried to take the act, the horse arose and threw the man. The horse had been trained to stay "asleep" as long as the whip lay across its neck and to get up when the whip was removed. Because the whip was forgotten, the act failed.

Persian cats had been perfectly trained but were not accustomed to a musical accompaniment. When the band began to play, all twenty cats "jumped out of the ring, up through the rows of seats, out the top of the tent and raced away through the fields."<sup>8</sup>

Even changes that seem unimportant to the trainer may significantly change the situation for the animal. On occasion the animal reacts to features of the environment which the human being does not perceive. Inadvertantly the latter may alter the whole situation by changing an element that, to him, appears non-essential.<sup>9</sup> A rabbit that had been trained to push at a red door rather than at a grey, upon being presented with grey and white, tended to choose the grey. Apparently the "stimulus was 'darkening' rather than an absolute grey value."

The animal's response is aroused not only by the definite stimuli offered but may be due also to the relations between stimuli. Köhler trained his apes to find their food in the darker of two containers offered simultaneously. When a container of still darker grey was offered, that was chosen in preference to the one of familiar color. Their response was not to the particular container in which they were accustomed to find food; "... on the contrary they responded to the whole situation characterized by the relation 'darker than.'"<sup>10</sup> Such observations reveal the importance of the total situation in determining behavior.

Another illustration of the importance of the total situation is found in the fact that the act which has been perfected in the training ring must be taught all over again in the arena or on the platform. The dog that has learned to waltz in his master's room can still waltz on the stage, but he must learn to do it there. In other words, the act must be practiced in the situation in which it is to be performed.

### METHODS OF LEARNING

There are various ways in which animals learn. It seems easier to study the process of learning if these ways are grouped under certain headings as methods of learning. Those considered here are trial and error, negative adaptation, positive adaptation, heightened reaction, conditioned response, elimination of response, combination of responses, the use of cues.

**Trial and Error.**—To a very large extent animals learn by what has been called trial and error but perhaps would be better known as trial and success. Random movements—activity—lie at the basis of this method of learning. That group of movements which is followed by a satisfactory solution tends to be repeated.

Thorndike investigated the ability of various animals to find their way out of puzzle boxes. A hungry animal was put in an inclosure from which it "could escape by some simple act, such as pulling at a loop of cord, pressing a lever, or stepping on a platform." When an animal was introduced into this puzzle box, food was placed outside so that he could see it. This procedure was tried repeatedly until the animal "had formed a perfect association between the sense-impression of the interior of the box and the impulse leading to the successful movement." Being none too comfortable, he tried to escape, struggled vigorously; when finally he succeeded in escaping, he was rewarded by the privilege of eating the food outside.<sup>11</sup>

A kitten by accident ran against a small rubber ball, set it rolling, and instantly dashed after. Attempts to pounce on the ball only served to start it rolling again. So a ball by chance became a plaything.

Trial and error becomes the necessary method whenever directions regarding the correct procedure are lacking or insuf-

ficient or in case the directions given are ignored. The impossibility of giving a complete explanation to animals is so obvious as to make the suggestion that it be done a ridiculous one.

The more varied the random movements the greater are the possibilities for learning. Since the simplest organism possesses only one form of response, the extent of its learning is rigidly limited. Contrariwise, the behavior of higher animals exhibits not one but many kinds of response, and consequently the possibilities for learning are varied. If living creatures were ranked in the order of their capacity for random movement, such a ranking would correspond roughly with a capacity for learning.

Even so low a form of life as the starfish shows many possibilities of trial and error behavior. Almost every household boasts a dog that has learned to open the door or a horse that can open the pasture gate. The puzzle box and maze of the laboratory are miniature and stereotyped reproductions of these situations.

Preyer slipped rubber tubing over the middle part of one of the arms of a starfish; the animal tried to get rid of it by rubbing it off against the ground, by shaking it off, by waving the arm pendulum wise in the air, by holding the tube against the ground with a neighboring arm and pulling the afflicted one out, by pressing other arms against the tube and pushing it off, and finally, as a last resort, by amputating the arm.<sup>12</sup>

In trial and error learning there is no possibility of foreseeing the essential movements. Being activated by a powerful drive such as hunger or sex, the animal makes not only useless movements but the essential movements as well. Without reasoning or having any idea as to what the effective movements may be, the animal stumbles upon the successful response. The response which succeeds in achieving the goal tends to be repeated. This stamping in of the correct response by success is accompanied by elimination of useless movements, until at length the perfected response occurs without diffusion of energy in unnecessary accompaniments.

**Negative Adaptation.**—A second method of learning is that of negative adaptation, which occurs when the stimulus loses its power to call forth a response. Stimuli which are harmless or meaningless, that is, unimportant, are ignored.

In the lower animals this loss of response is temporary and is similar to sensory adaptation in higher animals. Upon entering a room one may find an odor overpowering, but before long the smell is no longer detected because the sense organs have become fatigued and do not respond to the stimuli. Similarly, the one-celled animal ceases to respond to a repeated stimulus, but after a period of rest the response reoccurs.

In the higher animals, however, permanent adaptation or learning takes place. The spider that dropped from its web at the sound of a tuning fork declined to disturb itself after the stimulus had been applied several times. The hen with chickens ceases to fly at the person who puts her into her coop at night. A certain cow had been milked by only one person. When this person was ill, the cow refused to allow anyone else to go near her. Finally the substitute milker donned the bonnet and jumper which the familiar milker was accustomed to wear. To these the cow was resigned. Then she permitted the jumper to be left off and finally the bonnet, for she had grown used to the unfamiliar voice.

When the time has come to begin the training of a lion born in captivity, it is necessary first to bring him into close relationship with the trainer. The first step is to put him into a smaller cage with movable bars. Day by day these are moved until the cage is small enough to permit a fairly long stick to reach from front to back. This stick is allowed to remain in the cage for several hours. When the lion has grown accustomed to it (become negatively adapted to the presence of the stick), it is rubbed along his neck and back. Finding the stroking pleasant, he permits the rubbing without protest. A piece of meat at the end of the stick is an inducement to allow the end of the stick to come close to him. As he becomes accustomed to the stick, it is shortened until the hand can be substituted. Daily the trainer familiarizes the animal with his presence and touch until at length the lion has ceased to object and will respond in the manner desired.<sup>13</sup>

A lion caught in the jungle must first be chained to the cage so that he cannot get at the trainer when he enters it. Gradually the time spent by the trainer in the cage is increased. As the lion pays less attention to him, the chain is lengthened until finally the lion moves about freely.<sup>14</sup>

The family cow refused a certain kind of feed. Every time it was given to her she would smell of it, perhaps move it about a bit. Then just a little of it was mixed with acceptable feed—so little as not to be detected. The amount was gradually increased until she ate the new food without any objection.

Martin Johnson in his account of taking moving pictures of wild animals says that when the giraffe or zebra is drinking he picks up his ears at the first slight sound of the turning of the camera handle. The moment the handle begins to turn, the animal looks around; "as the sound continues and nothing happens, he goes ahead drinking." When the noise stops, he gives a start and again looks around. "Strange to say, a click of the still camera frightens him more than the whirr of the moving cameras."<sup>15</sup> In his account of experiences at Barro, Colorado, Frank M. Chapman describes the taming of a coati. "Day by day the distances at which bits of bananas were received were shortened and with the gradually closer approach there seemed to be an intelligent appreciation of our changing relations. . . . At length a bit of banana was offered on the end of a long stick. . . ." Finally a banana was seized but with a grab and a panic-stricken retreat. The banana was then held more firmly so that only bites could be taken. These were seized one at a time and were eaten only after the coati had backed off several yards. In the end he put his hands on the hand of the man who held the banana, while quietly enjoying his meal.<sup>16</sup>

**Positive Adaptation.**—Not only are meaningless or useless stimuli ignored, but meaningful and useful stimuli become more potent through repeated working. The expert dog trainer uses the dog's name only when summoning him; consequently that particular group of sounds acquires great force as a stimulus. It is said that horse buyers determine whether a horse has ever had the mange by stroking his flank. "A horse that has had mange and has through practice developed positive adaptation of the natural skin-biting response will respond years later by a quivering of the lip."<sup>16a</sup>

A pony was taught to ask for corn by raising his foot. When he was shown some corn, his foot was lifted. After many trials and successful efforts the pony realized what was wanted when his

foot was patted so that whenever he saw the corn he lifted his foot. So thoroughly did the pony learn that pawing would obtain an ear of corn that he used the method whenever he saw a particular individual approaching.

By being rewarded with food a Samoyed had been taught to offer his paw to shake hands. He was asked for his paw by every member of the family who entered the house and soon learned to offer it without request whenever anyone entered.

A lion or a tiger kitten brought up as the pet of a private family is almost always badly trained or spoiled. He has formed all sorts of bad habits that the trainer must correct. Indeed, trainers believe it hardly worth while to work with a feline whose infancy has been passed as a member of a private family.<sup>17</sup>

**Heightened Reaction.**—The effect of previous stimulation may be to increase the intensity of response. In the earthworm, for example, various stages of excitability may exist as a result of previous stimulations. These stages of excitability vary all the way from a state of rest, in which a slight stimulus produces no effect, to one of violence in which moderate stimulation will cause the animal to “whip around” into a reversed position or wave its head wildly in the air. A cat that knows the smell and taste of fish becomes frantic if her participation in the fish for dinner is limited to the olfactory realm. Pulling the reins tends to make a horse run harder. A horse that knows the spur is set into rapid motion by a light touch on his flank.

Anyone who has ever assisted at the rite of giving a kitten its bath has observed the heightening of response. When first put into the water, Puss makes comparatively little objection. Gradually, however, her protests increase, no matter how gently the process of scrubbing be done, until finally, if chance offers, she bites the hand that scrubs her.

**Conditioned Responses.**—Frequently the natural response is not modified but becomes attached to a stimulus other than the one that originally caused it. In other words, an indifferent stimulus, through occurring with the stimulus that naturally calls for a response, acquires that same response. Chickens run at the call of “chick chick” because that call has accompanied the scattering of grain. “When a response is elicited by a new

stimulus, because of the fact that the new stimulus has occurred along with the old, it is called a *conditioned response*."<sup>18</sup>

In the ring the identical situation offered by the apparatus—the paraphernalia of his performance—serves as a conditioned stimulus to produce the desired result, in this case the act or trick.

The cowboy trains his horse to stand untied by using a sharp bit and staking the reins to the ground. When the horse attempts to walk off, his mouth is hurt so that he learns to stand when the reins are dropped even though there is nothing to keep him from moving away. A horse that shies once is apt to shy again at the same place.

A dog insisted on eating the cat's food. Put on a leash too short to permit him to reach the cat's plate, his jumping and barking brought him no nearer success. Little by little the leash was lengthened and was finally removed when the dog ceased making an effort to reach the plate. At a later time when the dog was put on a leash he did not bark at the cat; when it was removed, however, he barked but made no effort to reach her.

A pair of wolves with four pups that had escaped from their inclosure in the Washington Zoo went directly to the rear door of the lion house where they waited for the keeper with their rations. Any attempt at catching them would have served to scatter them over the park. The keeper walked toward them carrying the basket which held their food, whereupon they followed him back into their inclosure.<sup>19</sup>

**Elimination of Responses.**—In learning it is necessary not only that desirable responses be fixed but also that undesirable responses be eliminated—the response must be detached from the stimulus that originally aroused it. Two ways in which elimination occurs—the dropping of useless movements and negative adaptation—have already been discussed.

Elimination takes place quickly when response is accompanied by pain. A girl was afraid that her cat would hurt her pet duck. Her father said, "Bring the duck and put it on the floor, then let the cat in." When the cat saw the duck it ran toward it. Because the cat was whipped with a stick as it started toward the duck, it never attempted to bother the duck again. If a horse is punished because he refuses to pass an



object of which he is afraid, he associates the punishment with the object which inspires him with fear. On seeing anew the object which made him afraid, he expects to be punished again.

The Indian method of breaking wild horses, as described by Chief Long Lance,<sup>20</sup> is a combination of negative conditioning with negative adaptation. First there is the process of accustoming the horse to the sound of the human voice—"horse talk"—then the horse is given an opportunity to become used to human odor and touch; in the next place an arrangement of rawhide strings is slipped around nose and ears in such fashion that it will tighten at the slightest pull from the horse. The secret of this is that whenever the horse makes a sudden pull on the string it tightens the grip on certain nerves around the nose and back of the ears, and this either stuns him or hurts him so badly that he does not try to pull it again. The warrior runs his fingers over every square inch of the horse's body. Gradually the horse is given a chance to grow used to a blanket on his back, and finally the warrior places both hands on his back, pressing harder and harder, drawing his body up until the whole weight rests on the horse. "After the warrior has hung on his back by his elbows for several periods of about thirty seconds each, he will gradually pull himself up, up, up, until he is ready to throw his right foot over to the other side. It is a strange fact that few horses broken in this manner ever try to buck."

A stimulus which ordinarily would call forth a certain result may be rendered ineffective by the presence of an inhibiting stimulus. The experiment in which perch separated from minnows by a glass wall learned after frequent bumping of their noses not to attempt to eat the minnows illustrates this point. Even when the glass partition was removed so that the minnows could easily be seized, they were let severely alone. Finally this learned response broke down when new stimuli in the form of great activity on the part of the minnows aroused the perch to pursuit.<sup>21</sup>

Nothing is more annoying than a dog that barks in the middle of the night. One night when the pet pup came out of his kennel to bark, his owner was ready for him with a folded newspaper and slapped him smartly each time he appeared. Apparently his favorite hour for barking was between two and three in the morning, but as long as he stayed inside his kennel he made no effort to bark.

For three or four nights he met a folded newspaper whenever he came out, but after that the neighborhood was more peaceful.

A tame thrush that was offered a currant moth caterpillar, black, white, and yellow in color, hopped down from his perch, picked it up, pinched it, dropped it, hopped back to his perch, wiping his beak vigorously, and took no further notice of the caterpillar. Although he refused to notice this particular creature again, he "sampled" all other small, moving things.<sup>22</sup>

When the response continually fails to produce the desired result, elimination comes more gradually. A door screen kept the dog out of the house when he tried to walk in. Later on, although the screen became broken, the dog made no attempt to get through the hole.

A cow was pastured in a back lot the gate of which had a simple latch like a curved nail hooked in a loop. The cow's feed being on the other side of the gate, she learned easily to open it through trial and error. For this reason the latch was modified by adding a little cross section which could be manipulated only by thumb and finger. For some time the cow tried repeatedly to loosen the latch. Over a period of about four days this attempt was repeated without success. Having failed and being delayed each time, the cow finally gave up trying to open the gate and the response was thus entirely eliminated.

**Combinations of Responses.**—Movements may be organized into series; no longer is there need for outside stimuli when the series has been initiated; each movement supplies the stimulus which calls for the next. That such learning functions in maze running is indicated by the rat's performance when the alleys are changed. If an alley is shortened, the rat will run head on into the partition. Apparently kinaesthetic sensations guide his turning at the proper places, and he has learned the run as a whole, not in separate sections.

Since useless movements may become a part of the organized system, it is important that they be dropped out as soon as possible. An amusing illustration of the inclusion of a useless response was afforded by a pack horse who every morning after his load had been fastened insisted on turning a somersault. Even though he never succeeded in dislodging the pack, he seemed to have included this as part of the preparation for the day's work.

W. H. Hudson tells<sup>23</sup> of Viscount Grey's wild squirrels that "quickly find out when he is at home and make their way to the house, scale the walls, and invade the library; then, jumping upon his writing table, are rewarded with nuts, which they take from his hand." In such a complicated series of acts each response serves as the stimulus for the next. The importance of cues in animal learning is due to the capacity of the animal to combine responses into a series.

**Cues in Animal Learning.**—Animal learning depends to a large extent upon cues. The animal learns to respond to slight movements on the part of the trainer. These movements provide the stimulus for the next response. In the case of the famous horse Kluges Hans which for a time was thought to be able to solve problems in arithmetic, these cues were so slight as to be undetected by the observers. Nor was the trainer conscious of giving them. Yet Hans was unable to execute his performance when his trainer was separated from him by a curtain. The dog which answers questions by ringing a bell does so because he has learned to associate the correct response with a signal given, more or less consciously, by his trainer.

How does the farmer's dog know whether he may follow the wagon or must remain at home? He shows great skill in reading the cues correctly. A horse always knows whether or not his rider is afraid of him and behaves accordingly. The most baffling aspect of cues is that even though they are given unconsciously they are completely effective signals to the animal.

Unfortunately the significant feature may be something quite other than that which is intended to be important. Even at the age of twelve months the family cat had failed to become reconciled to its weekly bath but had learned that the odor of creosote was inevitably followed by a scrubbing. The slightest whiff was enough to send him into hiding. He possessed almost an uncanny skill in concealing himself. While he was safely out of sight he kept watch of the movements of his mistress, and as soon as she had passed beyond reach he would dash for an open door or an unhooked screen. What he was actually being trained to do was to seek a hiding place indoors or out whenever preparations for his bath were begun.

On the other hand, a pleasant result which comes after a sequence of otherwise unpleasant or indifferent motions may be effective in causing an animal to go through a fairly complicated activity. A young girl wished to teach her dog to run around in a circle barking and trying to catch his tail in his mouth whenever she snapped her fingers; she did so by tying a piece of meat on the dog's tail and then commanding him to catch it. Naturally the dog's nose pursued the meat. After much practice the dog learned to pursue his tail. After the same fashion a cat permitted himself to be tossed through a hoop when rewarded by meat on the other side. Finally all the cat needed was a glimpse of the food in order to induce him to jump through.

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## CHAPTER II

### CHILD LEARNING

The methods of animal learning function also in child learning. The child's acquisition of knowledge and skills proceeds along the lines sketched in the preceding chapter, but, because the goal to be reached in child learning differs from that in animal learning, the methods are modified and new principles come into play.

Such a view of the similarity of animal and child learning illumines the whole process of the acquisition of skill and knowledge and shifts emphasis from the matter learned to the learning, throwing light upon the teaching process. Thus teaching or causing to learn is seen to be the obverse of learning. Consequently it should proceed along the same lines as learning, for by so doing the child's acquisition is facilitated. Much so called failure to learn is in reality the learning of what actually was taught, for what we really teach and what we think we teach are not always identical. A restatement of the methods of learning in terms of the child's utilization of them is next in order.

### METHODS OF LEARNING

Before synaptic connections<sup>1</sup> are established in the fetus, stimulation of end organs may produce a variety of responses; in Holt's words, "the afferent impulse passes diffusely along whatever lines of least resistance it finds." So in the newborn, the baby's movements are random, variable. Since nervous impulses are spread so widely and responses are so variable, the possible functional connections between sense organ and muscle are almost unlimited. Learning comes by way of limiting the "range of motor outlet" so that impulses traverse "more definite paths of specifically lowered resistance." Since additional excitation finds outlet along the neural paths just used, any activity tends to reinforce itself. Consequently the infant's behavior is characterized by reiteration, by repetition.

This complicated process of learning which begins during fetal life is difficult to trace. In order to bring about an apparent simplicity we make use of the term *trial and error learning*.

**Trial and Error.**—An important part in human as well as in animal learning is played by trial and error. It is by the random movements of the trunk and limbs that the baby lays the foundation for the finely coordinated movements of adult life. Except for them there would be neither tennis nor ballet dancing, to say nothing of walking, sewing, writing, and gardening. The tendency to activity which characterizes the human infant as well as

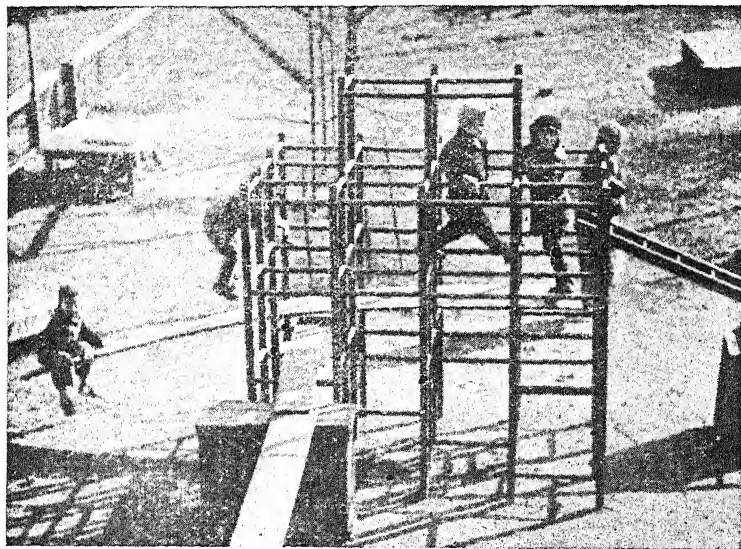


Fig. 1.—Children have an appetite for movement.

the animal brings about all sorts of undirected movements. The significant movements, those which produce a serviceable result, are established. Useless movements gradually drop out, while the useful or successful ones tend to be repeated, become fixed, and are coordinated into more or less effective sequences. Thus thrashing about of the arms becomes perfected into the eye-hand coordination; the gurgling and babbling become refined into speech sounds. Nor does the function of random movements cease with babyhood. All through childhood and even adult

life, trial and error plays an important, if diminishing, part in learning.

The infant's dependence upon trial and error learning is a commonplace. Obviously it is impossible to give him definite instruction or, indeed, any instruction that will lead to the mastery of body control. Trial and error learning on the part of the infant is necessitated by the impossibility of the adult's giving him precise and specific instruction. This inability is due (1) to the adult's complete ignorance of how to proceed with such instruction, (2) to the lack of knowledge on the adult's part as to what the desirable activity may be, and (3) to his inability to determine or discover the steps by which the desired activity may be achieved. Whatever instruction we do give infants is, in fact, trial and error teaching.

The foundations are laid at this time for the "spoiled" child, since both parent and child are working according to the trial and error method. Whether the child becomes "spoiled" or not depends upon what sort of response he finds successful and also upon whether this successful response is socially acceptable to others.

Many an achievement would never have been dreamed of except by way of trial and error. A two year old loved to climb up on a sawhorse by way of the strips of wood nailed lengthwise from leg to leg. One day while standing on top he slipped so that he landed astride. This surprising addition to his achievement pleased him so much that he scrambled down and up, again and again, each time slipping astride the horse.

A nursery school cloakroom offers varied examples of trial and error learning. When left to himself to get out of leggings and shoes, the child pulls and pushes various attachments until he strikes the right fastening or shoe string. Nor does he learn immediately what it is that has turned the trick but must try again the next time in the same way. Finally, like the cat of puzzle-box fame, he learns to escape immediately by doing the correct thing.

A three year old was trying blindly to button the top button of her coat. When finally she did succeed by stumbling on the correct way, she was greatly elated and willingly did it over again in response to the suggestion that the next time she wanted to do

it she could. Again several trials were necessary before she succeeded. This time she herself wished to do it again and succeeded as quickly as with the lower buttons, which she was accustomed to do.

In learning to untie a shoe string which was in a hard knot, a child picked at one bit of it and then at another, being unable to detect the movement which would loosen the knot. Finally he discovered that by holding one side and at the same time pulling the other end he was able to loosen the knot.

A child's strength may not be great enough to pull open a door which has caught at the bottom. He tries, pushing and pulling, until by chance he gives the upward pull which releases the pressure. Many unnecessary movements are made and greater energy expended than would be used in a skilled act. Even after he has solved his difficulty he cannot immediately repeat the series of movements leading to success but must repeat a great many random movements until finally he masters the act.

Whenever a particular end cannot be foreseen or the direct steps thereto planned in advance, trial and error comes into play. So it is by trial and error that the child learns to dress himself, putting the right shoe on the right foot; putting his arm into the sleeve so that the coat will button in front instead of hind side before. Explaining may help but it is through trial and error that the process is mastered.

The perfection of process involves the elimination of movements. The first time J. made the doll's bed she took a long time (about ten minutes) to put on three blankets, because she did so many things there was no need of doing. A few months later she was seen to make it completely four times in ten minutes. The saving in time was due to the fact that she made only the necessary movements in spreading each blanket.

Learning through experience often involves expenditure of time and energy before the child realizes that his method is faulty. G., working at the carpenter bench, was trying to nail two strips of wood together. The first nail went through the first strip easily but slipped outside the second. He pulled it out and tried again, using the same hole, only to find that again the nail missed the second strip. The third time he tried it with



the same result. Finally, temporarily abandoning the first hole, he started a nail at another place and was successful. Having succeeded he now tried again to utilize the first hole. This attempt being no more successful than the others, he decided to discard that hole altogether. Making another fresh start he was able to fasten the two strips together.

J., aged two, also tried to use a hammer but could not hold it firmly enough to hit a nail. Hitting the bench as often as she hit the board, she was able to strike only an occasional glancing blow. J. kept on working with the hammer until within six weeks she could drive a nail successfully.

When once the correct solution has been found, there may be no further experimenting. A four-year-old boy was trying to repair an airplane, but the two crosspieces were not well enough supported and, as a consequence, his hammer blows were altogether ineffective. First he held the hammer with both hands, pounding with all his strength, but this served only to loosen more joints. Then he held the airplane with his left hand, using the hammer with his right. Although an improvement, there was still much to be desired. Then he tried to turn the airplane so that it would have a better foundation. Finally he asked one of the other children to hold it while he nailed. When next he needed to make repairs he immediately called this child, asking him to help by holding.

L. was trying to "skin the cat" on the horizontal bar. Hanging by her hands was easy, but she did not know what to do with her feet. First she lifted them from the ground, then raised them in front of her. At last she put one foot over the bar, then both, then suddenly turned over but, letting go, fell. Again and again she tried until she could turn over successfully without falling. Then she celebrated her triumph by calling the other children to watch her.

B. L. was trying to blow soap bubbles. At first she held the bowl of the pipe up side down. This did not make the bubbles come where she expected them, so she turned her pipe at first sideways, then finally right side up. She blew too hard at first but tried again and again, sometimes even drawing her breath in instead of blowing, until finally she succeeded in producing satisfactory bubbles.

Trial and error plays a part not only in the management of things but in the management of people as well. S., aged four, took the pad and pencil which M., aged three, had been using. Although M. had finished playing with them, she wanted to carry them around with her and she asked S. to return them. When he refused she ran after him; then she threatened to hit him. Next she told the other children about her difficulty, evidently hoping by means of adverse public opinion to shame him into returning her property. Finally she cried. This crying solved her problem, gained her end. A little later when S. again took her pad and pencil she cried immediately, making use of the successful method. In all probability this was not the first time she had discovered that by crying she could carry her point.

By trial and error the baby learns quickly that crying is almost certainly successful in gaining his end. Almost as quickly is crying discarded when it is found to be an unsuccessful method. The success of this method is the greater because it is both an innate response and a highly practiced one and in addition is highly unpleasant to the listener. Its potency is the greater because it can be nicely graded in degree to meet the urgency or the difficulty of the occasion.

One day D. wanted a box that was in the cupboard. First he tried to pull the door open, only to discover that it was fastened. Then he pulled a chair up so that he could reach the key to turn it in the lock. Then he tried to open the door but could not do so, because the chair on which he stood held it shut. Finally he got down, moved the chair away, and opened the door. Not finding what he wanted in that cupboard, he went into the next room, immediately pulled up a chair, unlocked the door, pushed the chair aside, and opened the door. And all this he did without the hesitation and false moves that had characterized his other attempt at door opening.

Diversified activity in a puzzling situation contributes to the chance of solution. Such random or undirected activity may hit upon the movement or series of movements which solve the problem. In such trial and error learning the first need is orientation in the problem situation. Through chance success a clue is discovered. Thereafter blind reaction is no longer inevitable. The orientation of the learner in a problem situation

make possible a more intelligent, a more economical attack upon that problem.

If the speed and efficiency of a given performance be the criterion, trial and error is a wasteful method—wasteful of both time and energy. To put a child through the correct series of movements for the time being accomplishes that single act more quickly and more effectively. When a child is confronted with a situation that he himself must solve, he teaches himself through trial and error. Even though trial and error is an expensive method of learning, the effectiveness of active response on the part of the learner must be kept in mind. It is by virtue of active participation on the part of the learner that trial and error functions.

**Negative Adaptation.**—Learning involves not only active response but also the ignoring of useless and meaningless stimuli. The excitable individual who attends to every stimulus is no longer teachable. This condition, in its milder forms, we call distractibility, while, in exaggerated degree, it becomes a manic condition.

By ignoring stimuli that are not significant the individual protects himself from overstimulation and frees himself for response to significant stimuli. Many a child has learned to protect himself by this method against stimuli that at the moment interfere with his desires. For example, S. pays no attention to his mother when she speaks his name. Indeed, she says it so often that he would have little leisure for his own affairs did he attend to every "Sidney."

The mother who is in the habit of calling loudly from the doorway to summon her boy to supper thinks that he lies when he tells her he did not hear her call. She has called so often without enforcing obedience that he is negatively adapted to her voice when it is tuned to calling pitch.

One child had developed a reputation for refusing cod-liver oil which had been prescribed by his doctor. The first day that it was offered him at the nursery school he took it under protest, saying that he did not like it. As the days went on his protests diminished in volume until he no longer paid any attention to the flavor but took his spoonful with all the indifference in the world.

Negative adaptation is one of the important methods involved in learning to eat new or previously disliked foods. Through repeated tasting the child learns to ignore the flavor or consistency or color that once was so unpleasant that he refused to touch it. This method of negative adaptation is apt to work slowly, so that patience is demanded on the part of the teacher as well as on the part of the learner.

When offered tomato juice, H. cried, refusing to drink it. At first he would merely taste it but after a time drank it when it was offered to him and finally did so voluntarily. J., who was no fonder of tomato juice, said it tasted "like grease" but by daily practice learned in a few weeks to swallow it without protest. During his first days in the nursery school this same child, who had never been used to negro servants, was disturbed by the presence of the negro cook. Before long, however, she had become for him, as for the other children, just "Lilly the cook."

In common speech negative adaptation is called "getting used to things." So the baby who is not promptly provided with a fresh diaper as soon as he needs one becomes negatively adapted to the sensations of discomfort. This involves more than does sensory adaptation, for in that case relief of fatigue of the end organs restores acuity. In negative adaptation actual learning occurs.

Negative adaptation takes place in the process of adjustment to a new situation. The sounds peculiar to an unfamiliar house are not heard after one has lived in it for a short while. When a child enters a nursery school he is beset by a multitude of new stimuli. He may attempt to shield himself from them by clinging to his mother; in order to escape he may try to hide behind her skirts. As the days go on, however, he comes to ignore many of these stimuli because they have no significance for him. His process of adjustment to the nursery school situation is largely, then, a matter of negative adaptation.

A newcomer in the nursery school may, according to his temperament, fly from one piece of apparatus to another, examining and as quickly dropping each, or he may be so absorbed in watching the other children that he has no time for anything else; or he may, in another case, spend all his time crying. At the end of the

day he may be completely fatigued, or when he reaches home he may be extraordinarily active. Gradually he settles down to participation in the nursery school routine.

**Heightened Reaction.**—If negative adaptation does not occur, a heightened reaction takes place, due to the cumulative effect of repeated stimuli. In other words, an exaggerated response is made instead of the mild one that might be expected.

Not only does the child through repeated experience learn to ignore harmless or meaningless stimuli, he learns also to attach increased importance to significant stimuli that have been frequently experienced. When his protests against a new food are ignored and the food is tasted again and again, he learns to eat it with comfort if not with relish. If, on the contrary, his protests are received as communications of importance, his refusal of that food becomes more and more vehement. At the risk of presenting a paradox, this opposition is set forth because so seldom do mothers and nurses appreciate that by paying such great attention to his dislikes they are training the child to refuse certain foods.

G., who was playing with a large rubber ball, suddenly threw it so that it hit another boy who was one of a group playing train. They asked him to stop. Then he hit a girl, who whimpered and asked him to stop. His response was to hit her again and again. The third time she screamed and burst into tears; her reaction as well as his was a heightened one.

The first time K. put her arm around M. and tried to lift her, the latter smiled; the second time, she whimpered. Several attempts on K.'s part, however, resulted in M.'s freeing herself and seeking protection from an adult.

N. was devoted to the other children but being only two was not very expert in expressing this affection. She would throw both arms around another child's neck and hug, until protests could no longer be ignored. Before long her favorite, J., learned to make loud protest at the first attempt to hug her.

Explorers tell of getting on one another's nerves until an unimportant mannerism becomes so intolerable that the repetition of a single one is regarded as justifiable cause for murder. In the same way a child may fight with another who has barely touched him, because all morning he has been irritated by unpleasant stimuli.

**Positive Adaptation.**—When, through trial and error, a response has been found satisfactory, positive adaptation may be initiated through repetition. The baby who has learned that his crying results in his being picked up cries when he hears an approaching step but stops when he is left alone. The occasional train that passes the nursery school is always an object of great interest. One day a child sang with joy, "I see a choo-choo." The other children took it up until now the sight of the train always calls forth the song.

This process of positive adaptation may function in increasing a child's resistance to desirable types of behavior or increasing his conformity to such desirable types. A child may become positively adapted to a toy or even a blanket so that he refuses to go to bed without it. When J. first came to the nursery school we found that she had great difficulty in going to sleep at nap time. She closed her eyes obediently and seemed to try to sleep, but after a few minutes she grew restless again. Upon inquiry we learned that she was accustomed to hugging a friendly blanket. Having become used to the sensations it provided she was quite unable to go to sleep without it. At home she demanded it so vociferously that her mother found yielding the easier course. As a result the positive adaptation increased. It is always unfortunate when a child becomes dependent upon a non-essential. For this reason, if for no other, a child should not learn to depend upon a toy or other constant companion to produce sleep.

Immediately upon arrival each morning, S. appropriated the doll carriage. He would wheel it out to the playground and round and about almost all morning. Even if his attention were for a brief interval attracted to something else, he shortly returned to the doll buggy. Yet being three and a half years of age he was expected to enjoy something other than the mere pushing about of a toy. Since there was nothing further for him to learn from this activity, and, moreover, since his absorption in it prevented the development of interest in something else, the doll buggies were put away—not only his favorite one but the others also. The next morning he went immediately to claim "his" doll buggy. When he did not find it there he inquired of various people, "Where is my doll buggy?" Finally, he turned

to a wheelbarrow—another wheeled toy—and gradually learned to use other apparatus which for him was educative.

Conformity in desirable ways also is due to positive adaptation. Through repetition familiar stimuli may acquire increased potency to produce a desired response. Frequently newcomers at the school object to opening their mouths for the doctor's inspection. As the performance is repeated day after day, readiness to comply with the command increases until the whole process goes through speedily and smoothly.

Perfect functioning of learned behavior in the human being involves acquisition of a flexibility due to an independence of the total group of original stimuli. To expect this flexibility of functioning during the process of learning is to expect the impossible. A significant illustration of this is found in the process of toilet training. The baby becomes conditioned to the given environment in which training has taken place. This includes both personal and impersonal factors, and a change in the former is even more potent to interrupt training than a change in the latter.

**Conditioned Response.**—An important method of learning is the conditioned response. As explained in the previous chapter, this term describes the transference of a response to a stimulus which, through association, has acquired power to call it forth. This depends upon the overlapping of the two stimuli in point of time. Above, the child's positive adaptation to the routine morning inspection was described. Conditioning also enters in; for example, a newcomer at the nursery school must be told by the doctor to open his mouth and say "Ah." Before long, however, he opens his mouth at sight of the doctor. The children are told at first to unbutton their clothes when they come into the toilet room after nap. Before long the entrance into the room initiates the process of unbuttoning. Even when half asleep they begin unbuttoning. After using the toilet they are taught to flush it. One day S. who had just come into the room reached over and flushed the toilet. When asked why he had done it he looked perplexed, then smiled and said, "I always do this when I am here."

While Nicky was studying a Greek verb, he heard that his beloved cat whom he had last seen lying on a bed of mustard and

cross had been killed. Always afterward he loathed the sight of mustard and cross, and there was a gap in his memory for that particular part of the verb.<sup>2</sup>

The baby opens his mouth when he sees the teaspoon containing orange juice, for the sight of the spoon acts as a stimulus. There is experimental evidence that conditioned responses develop at an earlier age in the normal than in the subnormal child.

When the time comes to discontinue the use of the nursery chair, it sometimes happens that the child refuses to use the toilet. This probably is an apparent rather than an actual refusal due to the fact that the nursery chair has become a conditioned stimulus for elimination. As the toilet does not offer identical or adequate stimulus, elimination does not occur. For this reason it is wiser to begin toilet training with the use of the stool rather than the nursery chair. A small seat with a back is available to facilitate the child's use of the bathroom fixture.

The rôle of conditioning, both positive and negative, in the realm of food is an important one. F. was negatively conditioned to food in general, because at the time that he should have been learning to eat solid food he was suffering from a low-grade poisoning that made him indifferent to food. His discomfort was attached to the obvious cause—food—rather than to the real cause—the lead poisoning. Most children and many adults are positively conditioned to ice cream, because it occurs at parties and other festive occasions.

**New Combinations or Responses Giving Higher Units.**—Progress in the learning of any particular activity develops through "coordination of simpler part movements." Such partial activities in walking "include kicking, pushing with the feet, holding the back erect, crawling, acquiring tonus of trunk and limbs in standing, stepping with support, standing alone"; when these component movements have become integrated the baby walks alone. This integration of separate movements into a series plays a part in the learning of all complex movements.<sup>3</sup> In learning to walk, each of these steps described by Allport is essential to the perfected process and in normal development occurs inevitably in accordance with maturation.



The integration of the constituent parts of a learned series, however, requires training in the consecutive performance of each member of the series in order that the process once initiated may carry itself to completion. It is through such orderly response series that skilled acts become possible. By means of this organization of series of acts the attention is freed from the responsibility of guiding the routine of daily living and released for original activities.<sup>4</sup>

Smooth functioning of the nursery school routine depends upon the organization of separate movements into a system. Morning inspection offers a good example. The child enters the doctor's office, walks across to her, opens his mouth, says "Ah," turns his head so that his ears can be seen, lifts his chin, and so on through the entire performance. Then comes farewell to mother and a dash down the hall to the drinking fountain. After a child has finished his dinner he pushes his chair under the table (so that it will be out of the way of other children), takes his plate to the serving table, puts his napkin in the basket, goes to the toilet, washes his hands, and so to bed. In preparing for dinner, he goes from the toilet room upstairs to rest. If this routine is interfered with so that he is late in getting ready for dinner, he seems unable to realize that he could go directly from the toilet room to the dining room (as he does after his nap) but instead insists on climbing the stairs to the sleeping room, crossing the room, and going down the stairs at the other end according to custom.

A child in learning to lace his shoes picks up each lace, puts it through the eyelet, and then drops it. After a time he learns to do two holes in succession with one lace and then two with the next until the whole business of lacing the shoe is a continuous series of movements. At first he laces each hole as a separate event, pausing between moves, confusing the laces, so that even when he has finished there are wrong crossings. The task is slowly and poorly done because it is full of mistakes and of details that are useless. Skill involves the elimination of these and an increased speed of the separate movements and quickness of association between them.

What is called dawdling may be due to failure to organize separate acts into a series. S., for example, took an endless

time in getting ready to go home. Although she had been in the school long enough to become familiar with the routine, she seemed to spend most of her time waiting for orders regarding the next thing to be done. Her teacher cut down the time materially by giving her the whole series of orders at once—"You are to go downstairs, to the toilet, wash your hands, drink your milk, put on your wraps, and go out of doors." In record time S. had accomplished it all. At first, of course, the acts must be learned separately but when mastered individually there is the further step necessary—integration into a series—so that each gives the stimulus for the next.

"Ceremonies" are often due to serial action. E., who was loth to part from his mother, went through a ritual each morning. Stepping through the door was the cue to cling tightly to his mother; walking across the hall was followed by the responses involved in the morning inspection. Completion of this gave the cue for a good-by kiss, and that in turn was followed by a dash down the hall and out upon the playground for a final wave of good-by. Interruption of this procedure by a stormy morning which meant indoor school precipitated a tantrum.

It frequently happens that these higher units of behavior involve a considerable lapse of time. The intervening time is filled with other responses. Yet at the proper moment the deferred member of this "higher unit" must come into function. One evidence of increasing maturity is the development of this capacity for deferred response. In other words, an end which cannot be immediately achieved is effected by virtue of the accomplishment of the intervening steps, while at the same time activities irrelevant to the matter in hand take place. A capacity for accomplishment of deferred ends depends upon the intensity and permanence of the incentive or upon training. It is through sensory cues that deferred responses come about. They do not occur in a vacuum.<sup>5</sup> Sensory cues seem essential in producing delayed response, once the original stimuli have ceased to act. Such a sensory cue may be organic or external to the body. Having occurred as part of the original situation, it serves as a substitute stimulus for the delayed response. "Our environment, our daily routine, and our rhythmical bodily movements are full of memoranda for those postponed reactions." "Having

made an engagement for Monday morning we keep it because the events of Monday differ from the events of Sunday." No response is ever given to an abstract forty-eight hours hence.<sup>6</sup> Since so many of the responses of adult life are of necessity delayed, it is important that in teaching, cues be developed which will call out the deferred responses.

Much of what is called discipline concerns itself with the establishment of acceptable stereotyped forms of behavior which will not admit sporadic bits involving the child in temporary difficulty. Devotion to the familiar sequence of events may be the emotional accompaniment of a high degree of habituation. The reluctance of little children to attempt the unfamiliar seems general. New foods are tasted with reluctance, if at all. One little girl cried bitterly when the time came to wear a new dress. She enjoyed buying new clothes and liked to have them in her closet but to put them on was another matter. Her mother said she had to "fight M." to get her to put on new shoes or any new garment. The often-mentioned devotion to the old and battered doll may be tinged with reluctance to give devotion to the new one.

It has been suggested that the extreme routining of the baby's life prescribed by the best usage in infant care tends to increase this unwillingness to attempt the new. Children vary markedly in their pliability with regard to routine. No doubt early training is an important factor, but there seem to be temperamental characteristics of significance. The children who readily organize a series of acts into a whole are the children who find it very difficult to discontinue an established routine, to substitute a new or varied series for the old.

**Elimination of Response.**—The persistence of spanking is due in part to the efficacy of punishment in eliminating responses. The present-day objection to spanking is due not to its attribute of punishment but to the accompanying factors—the effect on the person who administers it, the results (other than punishment) in the child. Both in the laboratory and in everyday experience the effect of punishment in learning is evident. The whole purpose is to eliminate unnecessary or undesirable responses. J., who for days had cried wildly when her mother left, quickly stopped doing so when she was put in a room alone. A child who had been

warned against playing in a puddle insisted on doing so and got his clothes wet. He was so soaked with the muddy water that he had to be given a bath at the school. This proved to be so effective a punishment that he carefully avoided the puddle. B's father spanked him for crossing the street alone. After that whenever he made a movement as though he would dash ahead, a word of command was all that was necessary.

As children grow older, conditioning due to arbitrary punishment comes less readily. Whenever the punishment is recognized as inevitable or comes quickly of itself without intervention from above, elimination occurs readily and more effectively. There probably are few adults who do not carry a rankling memory of a punishment which seemed to them unjust—even if in later life they recognize their own naughtiness. On the other hand, the child's quick recognition of a just punishment increases its effectiveness.

Failure as the cause of elimination of response is illustrated by the case of a child who opened the gate whenever he wished. To keep him in the yard, the hook was placed above his reach so that he could not open it. At first he looked surprised, then as he pushed harder he became vexed and began to cry. For several days he attempted to push the gate open but gradually seemed to forget it and finally made no attempt to open it.

Desirable as well as undesirable responses may be eliminated by failure. D. tried to untie a knot in his shoe string but found it impossible. After that whenever he found a knot in his strings he asked to have it done without making any effort himself to do it.

In teaching little children it is essential that unfortunate or undesirable behavior be eliminated. Such elimination to be permanent requires the substitution of desirable or acceptable activities. The failure of "don'ts" as a means of discipline is due partly to negative adaptation on the part of the child and partly to failure to provide an alternative. Whether or not the adult is inconvenienced, the child continues to react to the stimuli impinging on his nervous system. It is, therefore, the part of wisdom to provide opportunity for wholesome responses and also to aid the child in discovering valuable, constructive forms of behavior, to help him to see new possibilities in the materials at his disposal.

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## CHAPTER III

### COMPARISON OF HUMAN AND ANIMAL LEARNING

Animal learning appears to be comparatively simple when contrasted with human learning. This greater simplicity is due to three fundamental differences. In the first place, the capacity for acquisition of skills and knowledge is infinitely greater in the human infant. In the second place, the goal to be reached is a different one. In the third place, additional factors enter in which do not function in animal learning.

#### ADDITIONAL FACTORS IN CHILD LEARNING

The third aspect, that of the additional factors involved, will be considered first. While an animal's behavior indicates perception of relationship, such perception appears to be limited and does not endure through any great delay. The child's development of learning begins in such a simple stage but does not halt there. On the contrary it proceeds by means of an ever increasing perception of relationships. Although animals should be credited with ability to perceive relationships, the higher the level of intelligence the richer, the more varied this perception. The word insight has been used to describe this process.<sup>1</sup>

According to Koffka,<sup>2</sup> "learning is never entirely specific," that is, limited to a given situation. An animal that has intelligently mastered a problem has learned to master that same problem when it occurs again and has "become capable of solving different problems that previously it could not solve." Learning, therefore, "is true development and not a mechanical addition of performances."

Such development of learning involves both analysis and unification of experience. As the child's ability to integrate his experience increases, he is said to be developing in ability to reason. The capacity for drawing valid conclusions, for making sound, independent judgments does not appear suddenly but

must be developed. In animal learning this plays no part, for an animal is well trained when he has learned to react in a specific way to a given situation.

Just as the animal may react to elements of the environment of which the human being is oblivious, so may the child, by taking into consideration factors which are of no importance to the adult, arrive at a far different conclusion from that reached by the latter. The human infant reasons from birth within the scope of his data. These data are not the same as those which the adult has at his disposal, frequently being not only less comprehensive in scope but also laying emphasis on the immediate situation rather than considering the more remote. Often items that escape the adult are included in the child's data with the emphasis differently placed because of a different valuation. Consequently the child may arrive at conclusions which vary from those reached by the adult who believes himself to be dealing with the same situation.

The child is predisposed to inadequate conclusions, because he is inexperienced and has limited opportunities for the accumulation of facts and ideas. Even though misunderstandings occur in this way, it is of great importance that the child have practice in drawing his own conclusions through a process of reasoning. It is only by so doing that he can develop a facility in arriving at conclusions which are valid because they are drawn from a consideration of the actual facts involved. Increasing experience yields increasing data and puts at the child's command a more complete equipment.

When the child's capacity for reasoning is considered from the standpoint of learning, emphasis is placed upon his progress toward control of data which will permit and facilitate the drawing of adequate conclusions.

Recognition of the importance of childhood as a time of preparation for adult living has been followed by appreciation of the fact that childhood is a part of life and not merely a time in which to prepare for life. A study of learning may seem to ignore this latter value, since its emphasis is on the importance of activities as means rather than as ends. Childhood offers an opportunity for passing on to the child the experiences of the race. In his capacity for assimilating these experiences the child further differs from the adult in the amount of relearning necessary. It is com-

paratively easy to perceive differences between the reasoning of child and adult but more difficult to trace the likenesses.

Piaget's important study<sup>3</sup> has emphasized the tendency in children's thinking to take for granted or omit logical relations and simply to infer relationship because of proximity or contiguity. This "juxtaposition," to use Piaget's term, is also shown in children's drawings by the accumulation of details which are important in, and for, themselves. In contrast with this tendency in a child's reason is what Piaget has called "syncretism," that is, the "spontaneous tendency on the part of children to take things in by means of a comprehensive act of perception instead of by the detection of details"—the "tendency to connect everything with everything else."<sup>4</sup> As the child's experiences increase and his subjectivity or egocentrism decreases, perception of logical relationships increases.

The goal in animal training is implicit obedience, unvarying repetition of the learned behavior. With the child, however, the goal is the development of skill in self-direction, the production of an adult who will be able to employ the skills and knowledge learned, not only in the old ways but in the new ways when the old are no longer serviceable, and who will be able to include new data, to reorganize the familiar to meet new situations.

### CAPACITY FOR LEARNING

The level of achievement reached depends upon the capacity of the learner and upon the drive or impetus toward achievement. Although animals apparently are able to communicate with one another, their inability to make use of ideas limits their range of achievement. It is true that learning does occur without the use of ideas in early babyhood. But, as the child develops, ideas and their communication play an increasingly large part in his acquisition of the knowledge and skill necessary if he is to assume his place as an adult.

As Thurstone has said in his "Nature of Intelligence," much of the machinery of the world is managed by individuals thinking on the level of concrete events, that is, in terms of the particulars of perceptual experience. The greater the intelligence, the higher the level of ability, the greater is the individual's ability to utilize ideas in learning, the greater his capacity for "conceptual



thinking which is in terms of universals."<sup>5</sup> The interests of the less intelligent person are narrower; his conversation concerns itself with particular and immediate events and therefore, "it is only natural that he should attain peace of mind and self-respect by claiming preference for concrete mindedness. He is 'practical.'"<sup>6</sup>

Animals are also "unable to abstract from concrete experiences the general principles which will help in subsequent experiences."<sup>7</sup> Capacity for comparison, generalization, and abstraction mark the level of human learning as distinct from animal.

The higher up in the animal scale the more complex behavior may be. Increased capacity for organization of behavior distinguishes human from animal learning. The hungry cat in the puzzle box dashes about, pushing and clawing until it escapes.

Diversified activity in a puzzling situation contributes to the chance of solution. Such random or undirected activity may hit upon the movement or series of movements which solve the problem. In such trial and error learning the first need is orientation with regard to the problem situation. The orientation of the learner in a problem situation makes possible a more intelligent, a more economical attack upon that problem. Through chance success a clue is discovered. Thereafter blind reaction is no longer inevitable. In learning by trial and error, the disappearance of useless movements is of lesser importance than the fixation of that behavior which leads to solution of the problem.<sup>8</sup> The child who wishes to open a gate may succeed through trial and error, but as his experience increases he learns to utilize past experience in the solution of new problems. Variability of response also is greater. The stereotyped responses of the animal give place to a wide range of individual behavior. The child's development is marked by "increasing capacity to meet a changed environment."

### ATTENTION

Both animal and child give spontaneous attention to those stimuli which offer relief for the state of physiological unrest. If training is to occur, however, both child and animal must learn to attend to stimuli other than these prepotent ones. The driving horse has learned to respond to tension of the lines. His

innate tendency to activity has been modified so that when coupled with sensations of pressure due to his harness these tensions on the lines have a definite significance for him.

The difference between human and animal capacity for learning depends in a measure upon the span of attention. In the

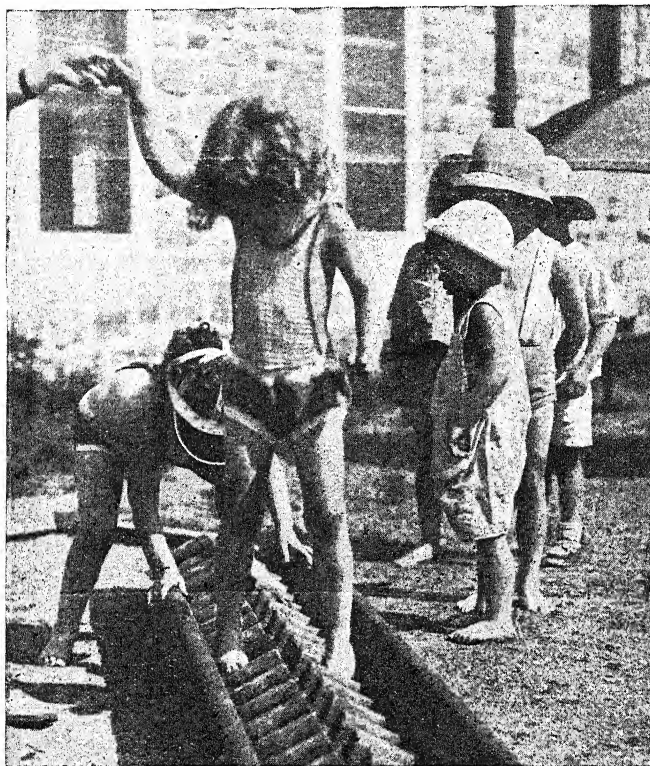


FIG. 2.—To achieve satisfactory results the child must give his attention to the matter in hand.

higher levels of intelligence the span of attention is usually greater. Certainly the function of voluntary attention is more important the greater the degree of intelligence. This capacity for maintaining interest in a given situation varies also from child to child. In general it does tend to increase with growth in intelligence until maturity is reached.

The average time devoted to one activity is greater in four year olds than in two year olds, while the average number of activities engaged in per hour is less. At the same time there is a greater variability in the four-year-old group than in the two-year-old group in the average time spent at one occupation. The power of a toy to attract is, however, not a perfect index of its ability to hold interest.<sup>9</sup>

These experimental findings bear out conclusions derived from observation. Furthermore one of the characteristics of superior ability is this persistence of attention as well as the duration and intensity of interest.

No one would expect a cat to learn the way to get out of a puzzle box if she were purring. It is because all her energy is focused upon escape that she hits upon the correct movement. In training children, however, we appear to expect to get satisfactory results without making sure that the child is giving his attention to the matter in hand. Frequently his energy is devoted to another pursuit. Because of this he pays no attention to the matter which the adult considers important. The disparity between child values and adult values, between child interest and adult interest, explains many a failure to learn, many a so-called disobedient act.

We attend to what is of importance to us. If attention is to be diverted to an extraneous factor it is necessary to call into play one of the means for attracting attention, "factors of advantage."<sup>10</sup> "Change" is an important one. If we expect the child to give his attention to a matter, we must make sure that the situation remains constant. Like the animal the child is distracted, that is, his attention is attracted elsewhere, by a new element in the environment or by any marked change. William James called attention to this defenselessness of little children against external stimuli which "makes the child seem to belong less to himself than to every object that happens to catch his notice."

When children are learning to feed themselves, it is difficult for them to attend to the process. The actual labor of lifting spoon or fork to the mouth a sufficient number of times to insure the ingestion of an adequate amount of food is in itself fatiguing. The child's attention shifts readily from this process, which is

monotonous and is also uninteresting after the first few mouthfuls which satisfy the hunger pang. To keep his attention focused the mother or nurse frequently resorts to some sort of game. By this means she really is building up a habit of inattention rather than one of attending to the matter in hand.

When a child is playing he may refuse to obey a call simply because the new stimulus, his mother's voice, was not sufficiently intense to divert his already absorbed attention. Such refusal is apparent rather than real but is frequently confused with deliberate disobedience.

### ATTITUDE

The attentive attitude is conducive to learning. In both animals and children this attentive attitude may appear to be present when it really is not there at all. Children acquire a good deal of skill in maintaining an outward semblance of attention.

Learning in both children and animals is facilitated by zest in activity, alertness, absorption in the matter in hand. In the child, however, such attitudes are more effective because of the greater intelligence. Joy in achievement, an "active attitude in face of difficulties," to use Burnham's phrase, is conducive to accomplishment. The hunger for sensory experiences, the craving to invest energy completely, the need to acquire knowledge are normal attitudes and contribute to learning.

It is true that attitude helps to determine progress, that dislike of work makes progress slow, for little effort is put forth and the subject is content to make poor records. It is true also that "the favorable attitude caused by good records becomes itself the cause of more good records."<sup>11</sup>

In studying the acquisition of motor skill by preschool children Goodenough and Brian<sup>12</sup> found that, in a ring-throwing game, the group having demonstration of procedure and being taught a definite procedure had an advantage over the groups having either no preliminary instruction or no subsequent criticism. It is important to remember that the setting up of undesirable habits retards progress.

Definite attitudes are formed early in life and persist. In the animal this matter of attitude is largely one of health and of the sort of treatment received. So also in the child; but in addition,

the child can evaluate his response, he has a capacity for self-criticism that makes greater achievement possible.

### ORGANIZATION OF BEHAVIOR

A study made by Augusta Alpert of problem solving by children shows four types of response: (1) the primitive, a reaching for the object with the hand; (2) random, characterized by resentment at being thwarted; (3) exploration and elimination, the deliberate trying out of one possibility after another or an investigation of the constituent parts of a situation; (4) immediate solution. The child's activity in the problem situation was determined more by the nature of the problem than by any other factor. Emotional, temperamental, and mental factors favored the arousal of insight and its consummation in a practical solution.<sup>13</sup> In this study, situations somewhat similar to those used by Köhler in his experiments with apes were set before young children.

Even when a child has shown his ability to solve a problem successfully, his slowness in repeating this solution, his inexpertness, his apparent inability to hold himself to a task until it is accomplished, to "attend to business," may be due to absence of that overlapping of different reactions which is as much an aspect of increasing facility as is the increase of extent or size of reaction.

Woodworth speaks of "doing two or more things at once, only that the two or more reactions are really parts of the same total activity."<sup>14</sup> The grouping of movements into higher units involves two sorts of action pattern, the "combinations of *simultaneous* movements, like the coordinated use of both hands in using an axe," or the combination of successive movements into an organized pattern. This latter involves anticipation of and preparation for the next movement.<sup>15</sup>

Apparently new movements are actually due to combinations of old movements. It is through these combinations that new achievements are possible. That a part at least of the stimulus for each movement in the combination is provided by the performance of the other movements is indicated by our inability to recall the series of finger movements involved in playing the piano except as we repeat the entire series.<sup>16</sup>

On the other hand, there is another sort of learning which makes possible the isolation of a part of a complex activity so

that it is performed separately.<sup>17</sup> Woodworth cites the example of achieving separate movement of the fingers. Another illustration is the serial opposition of thumb and fingers.

Both in human beings and in animals learning is greatly increased in range and complexity by the possibility of attaching responses to stimuli which originally were not effective in calling them forth. The process by which the attachments, that is, conditioned responses, are established is described by Woodworth<sup>18</sup> as follows: (1) The sensory activity set up by the conditioned stimulus, having no very definite or adequate motor response, does not discharge promptly into movement; (2) "at this moment, in response to another stimulus, an important motor activity, such as feeding or avoiding, starts up and dominates the individual"; finally, (3) "the undischarged sensory activity gets drawn into this dominant motor activity, and a linkage thus takes place between the sensory and the motor activity."

Conditioned responses are not irrevocable. If the artificial stimulus occurs repeatedly without the natural one, the association drops out; in other words, they can be trained out as they were trained in. This makes possible the discarding of responses which have become undesirable or useless.

Dunlap suggests that repetition of an undesirable act may aid in its elimination,<sup>19</sup> if annoyance at that act and a hope of eliminating it are kept in mind. This suggestion is pertinent not only as regards what is called discipline but also with reference to the dropping off of habitual acts and attitudes which are no longer serviceable. He reports results which show the method to be useful even with young children in the remedy of such undesirable and persistent habits as thumb sucking, bed wetting, masturbation.

Spitting is one of the recurrent, unpleasant activities which is effectively discouraged by this method. The child is offered a suitable receptacle and told to spit. Not only does he shortly exhaust the supply of saliva but he also loses all interest in the process of extending his personality through ejection of saliva. A child who persistently bites other children learns to desist through practice of biting. In this case, of course, inanimate materials are substituted as practice material.

## PERSONALITY OF TRAINER OR TEACHER

The expedition with which the process of learning goes on depends with both animals and children to a very large degree upon the personality of the trainer or teacher. Unlimited patience characterizes the successful trainer. When one of the animals in an "act" refused to respond to his cue, the audience grew restless and that made the trainer nervous so that he shouted at the lion. This was unusual and so unexpected that the animals "roared, jumped from their pedestals, and soon pinned the man to the ground."<sup>20</sup> Such may be the effect of impatience. In training children, as in training animals, patience and serenity are necessary. Both children and animals are adept at muscle reading; both readily grasp the irritation which nullifies the effect of a command.

Like animals, children respond less to the word of command than to the manner of the person giving the direction. If this manner be hesitating or unsure the command is not obeyed, but if the manner give evidence of confident expectation of obedience no other course seems possible.

A quiet self-command is an indispensable trait in the personality of trainer or teacher. This is not the same thing as a deliberate self-control which comes as a result of effort but, on the contrary, is the outward expression of an inner poise. If ever the Scriptural promise, "In quietness and confidence shall be your strength," holds true it is in the realm of child and animal training.

What is called "patience" in training animals and children is largely a matter of allowing time for adaptation, either positive or negative. The skillful nursery school teacher when confronted with a child who refuses to do what he is expected to do, what he is perfectly able to do, may give the appearance of a leisurely indifference. Instead of exerting pressure which would urge or even force the child, by a sort of creative waiting she gives him leisure to allow whatever has blocked his action to disappear. By matching the child's timelessness with her own she frees him from that stress which has put too great a demand upon his immediate willingness to give the desired response.

From observation of nursery school teachers it appears that the slow-reacting, non-explosive type secures the desired result more quickly and with a greater degree of true learning on the part of the child than does the quick-reacting type.

Effective training of both child and animal is a one-man job. Just as many cooks are said to interfere with the achievement of a perfect broth, so many trainers inevitably spoil the child. The bad behavior of the child brought up by a group of adults is notorious. To a large extent this inadequate training is due to the impossibility of the child's understanding clearly just what is expected of him. There is seldom any concerted effort on the part of the various adults to teach a desired response in a uniform manner, to say nothing of the failure to agree upon what should be taught.

The importance of constancy in the situation has been emphasized with reference to the exterior or environmental factors. Constancy of the personal factor surely is of equal importance when an act is first being learned; later it may be greatly advantageous in extending the functioning of the act.

Perfect functioning of learned behavior in the human being involves the acquisition of a flexibility due to some independence of the total group of original stimuli. To expect this flexibility of functioning during the process of learning is to expect the impossible. A significant illustration of this is provided by the process of toilet training. The baby becomes conditioned to the given environment in which training has taken place. This process involves both impersonal and personal factors. A change in the latter is even more potent to interrupt than a change in the former.

### DRIVE

Any consideration of learning would be incomplete if it did not include an effort to answer the questions: How does it come about that the young child attempts to appropriate his environment? What determines his interest or lack of interest in a given activity? How is it that the energy which at first is expended in diffuse activity becomes increasingly canalized until in maturity and old age it is exceedingly difficult for that energy to break new channels for itself; in Harriet Johnson's words, "How is the child set in motion in his environment?"



It is the tendency to activity which serves to expose child or animal to situations in which he will have opportunity for learning, but the level of activity appears to be directly related to the strength of the drive. The essential aspect of mind is its activity; the dynamic quality of mental life reveals itself in the invariable state of things which brings it about that every "cue has its consequent" and that such sequences are impulsive.

According to Hollingworth,<sup>21</sup> a drive or motive "is what initiates a process, keeps it going, and disappears when the process ceases." "So long as things are satisfying, activity is not required." It is the *persistence* of "annoyances, needs, wants, cravings, attitudes, dreads, appetites, organic states, and kinaesthetic states" that endows them with a dynamic quality, makes them motives. In the animal, drive "is a state of physiological unrest, due either to a lack or a superfluity of certain physiological substances."<sup>22</sup>

"A drive is not a momentary stimulus like a sound of an electric shock but a persistent physiological state that is present through the whole running"<sup>23</sup> (of the maze). Three principles that characterize the drive or motive are clearly stated by Washburn:<sup>24</sup> (1) Effective duration of the drive seems to be longer than effective duration of an external stimulus. (2) A drive may set in readiness any movement that "occurred while it lasted on a previous occasion." (3) "It will set most strongly in readiness those movements which most immediately preceded its resolution on a previous occasion."

Warden<sup>25</sup> limits the meaning of the word "'drive' to reaction tendencies that are of sufficient biological importance to represent seeking behavior directed toward some fairly definite class of incentive object, such as food, water, animal of the opposite sex, etc." The term "incentive-drive situation" calls attention to the close relationship between internal and external factors. Differences in the exact meaning attributed by various authors to the words "drive," "incentive," "motive," indicate both the complexity of these factors and the need for further study not only of the mechanisms by which stored energy is released but even more of the means by which we are steered through life, to borrow Holt's phrases.

The body possesses reserves of energy in excess of needs which are normally present.<sup>26</sup> These reserves of energy are the source of the "driving power of impulse." In the child, *drive* has qualities over and above those of animal behavior. Not only does drive play a more varied rôle in child learning than in animal learning, but because of the greater variability of response in the child and his higher level of intelligence, the ends achieved are more various and more complicated.

Obviously, it is impossible that all impulses should eventuate in action or that every desire should be realized. The complexity and profusion of possible satisfaction make it impossible that each opportunity for satisfaction should be tried. Since all desires are not equally worthy of satisfaction, the human being must select those that for him are of most worth.<sup>27</sup>

It is the interaction and intermingling of drives that bring about the complexity of actual behavior. While pleasant emotions of moderate intensity aid the fixation of habits of behavior, strong emotion of any kind is apt to be detrimental rather than helpful. The stirring up of the emotions gives a tremendous impetus to that behavior which seems to offer an outlet, an emotional release. So powerful a force is emotional activity that some writers attempt to explain drive altogether in terms of the emotions.

The higher the state of development reached by the individual the greater his capacity to direct energy toward the achievement of deferred ends and of ends not directly activated by a bodily craving. In the little child, energy finds immediate expression in behavior. The desire of the moment, that is, the transitory emotion, releases energy which is manifested in activity. Sensory experiences, pleasant or unpleasant, call forth behavior which involves excessive expenditure of energy. Nor is the duration of this behavior commensurate with its violence.

The direction of this energy into channels which will ensure greater duration and increase effectiveness is brought about to a large extent through the development of interests. If, however, interests are habitually fleeting, intense while they last but short-lived, the energy of the drive continues to reach less than its possible or desired effectiveness in the adult.

The possession of intense "wants" conduces to the focusing of effort upon the satisfaction of those wants. The individual whose "wants" are fewer or less insistent is not under the necessity of making a great exertion to satisfy those desires. Interest in, or desire to possess, the end result of any activity lends impetus to the effort to obtain that result.

Perhaps in no respect is individuality more clearly shown than in the number and intensity of wants. One source of this difference is found in the level of energy, another in conditioning. In the sound and wholesome personality, wants, capacities, and opportunities are balanced and interact in such a way as to evenuate in the maximum of both accomplishment and satisfaction.

Wants may serve as incentives to increased effort. Although the distinctions and resemblances between motives, wants, and incentives are not clear cut, nor is usage uniform, all three terms describe means for focusing and canalizing energy.

Experimental studies of learning in terms of the mastery of school subjects or of other skills have emphasized the importance of incentive. The incentive is of prime importance not only in human but in animal learning as well. The more removed the incentive from the immediate experience of the learner the less its effectiveness. Through conditioning, however, a remote incentive may become an immediate one. Important as capacity is in determining the potentialities of the individual, capacity without motive or drive remains potential but accomplishes little.

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## CHAPTER IV

### THE CHILD'S EQUIPMENT FOR LEARNING

Were it not for the interplay between growing organism and environment, development would be unknown and unimaginable. It is the capacity for response to the not-self as well as to the self that lies at the foundation of increasing power over the environment and makes possible appropriation of the materials offered by the world outside. Since this appropriation of the world outside the self begins before birth, learning may be said to begin with the appearance of sensitivity in the fetus.

#### FETAL RESPONSES

The uniform and tempered environment which the fetus knows, and which is necessary for fetal development, provides a range of sensory experience that seems limited in comparison with the more complicated opportunities into which the child is ushered at birth. The strength and variety of stimuli to which the organism may respond safely and without harm to itself—that is, the complexity of impression which is endurable and to which the organism is sensitive—is a measure of the development which that organism has attained. The extent to which the organism can satisfactorily respond to such a complexity of stimulation is the measure of the robustness of development.

The fetus is offered certain experiences that form an introduction to the world outside itself. Spontaneous movement of the fetus and movement away from cold or pressure applied to the mother's side supply kinaesthetic sensations. This movement away from pressure or cold indicates sensitivity of two other sorts—tactual and thermal. In this way the fetus is learning to notice what touches it.

Gesell,<sup>1</sup> quoting Minkowski's findings regarding fetal sensitivity, says that at two months "reflex movements follow a light touch on the skin." "These reflexes may irradiate over the

whole body," involving the head and trunk. When lip or tongue is stimulated, mouth movements through lifting or lowering of the chin occur as early as the third month. Definite patterned reflexes assert themselves from the fourth to the fifth month. For example, stimulating the foot called forth a reaction of the other hand—a "diagonal or trot reflex." If the head was turned toward one side, a movement in the arm or that side occurred. At about this time the reflexes of the labyrinth which originate in the semicircular canals appear. These reflexes, which enable the fetus to maintain equilibrium, "consist typically in bilateral symmetrical movements of arms or legs."

Minkowski, who observed human fetuses removed by Caesarian section, reports also that the embryonic human heart is active by the third week of gestation; that there are slow movements of the arms and legs at seven weeks; that plantar flexion of the toes is possible by the fifth prenatal month.<sup>2</sup> Movements of head, trunk, arms, and legs occur; cutaneous sensitivity is present, but, according to Compayré, embryonic conditions preclude the possibility of sensations of taste, smell, sight, or sound. There is evidence that four or five weeks preceding birth the human fetus is able to respond by sudden movements to loud sounds occurring outside the body of the mother. Although it seems probable that this is a true auditory-muscular reflex, there is a possibility that the response is due to tactile stimulation of the skin rather than to the stimulation of the auditory mechanism.<sup>3</sup>

Not only is there a differentiation of sensitivity to gustatory stimulation in infants prematurely born, but in addition reaction to similar stimulus tends to be similar. This definiteness of sensory response indicates that the sense organs are ready to function before the fetus has reached full term.

Consequently, before birth the fetus has stored up a variety of sensory impressions—kinaesthetic, cutaneous (contact and temperature), static (those due to the sense of equilibrium). It may be that visual, auditory, and gustatory stimuli also have reached him. The fact that infants born at the beginning of the seventh fetal month show the usual response of the full-term child indicates that only adequate stimuli are wanting to initiate the functioning of structures which have sufficient development at that age.

The constancy of the intrauterine environment protects the fetus from the multiplicity of stimuli to which birth exposes it. Gesell<sup>4</sup> says that "to insure survival there is an anticipatory augmentation of maturation of the behavior mechanism" before the age of seven months, "if not a slowing down in the last two fetal months."

### RESPONSES OF THE NEWBORN

Capacity for the newborn to respond to this enormously increased stimulation depends upon the growth of the nervous system. The degree of development attained at the moment of birth varies greatly from individual to individual. This degree of development reached is measured by the individual's capacity to withstand the shock of the sudden and extremely great change from a uniform and beneficent environment, offering a minimum of sensory experiences, to one which provides an infinite variety of sensory stimuli and offers, at best, a poor substitute for the protection withdrawn. Yet it is by reason of this bombardment of stimuli that the organism initiates those responses which not only enable it to survive but in addition make the development of learning inevitable.

The newborn child is greeted by an abrupt change in temperature to which he responds by a gasping which initiates the process of breathing—the birth cry. This crying soon becomes differentiated and early responds to the process of conditioning.

Instead of a cry a sneeze occasionally ushers in the breathing process. Sneezing occurs very early in the baby's life, sometimes before birth, and apparently is but little affected by training. Yawning comes almost immediately—as early as five seconds after birth—and hiccoughing can be noticed from seven days on. Even before the body is entirely delivered the eyes may be opened. One of the first movements is turning the head, and another that may happen immediately is raising the head.

The experimental studies of newborn infants at The Ohio State University under the direction of Weiss are of very great importance for their additions to our knowledge and also for the impetus they give to further investigation. The first of these to be published, Irwin's study<sup>5</sup> of the activities of infants throughout a period of ten days, has added greatly to our knowledge of the

motor behavior of newborn babies. The young baby lay upon a "stabilimeter" placed in a cabinet which isolated him from all changing stimuli except those originating within his own body. Irwin found that infants are more active just before nursing than just afterward; their greatest period of activity comes early in the morning, and their least about noon. On the first day they are least, and on the tenth, most active. When external stimuli remain constant, well-integrated behavior patterns are infrequent. When the change from placental to alimentary feeding has become well established, the behavior of the newborn infant is speeded up.

The behavior of newborn babies is of two sorts—specific movements and mass activity. The neurological immaturity of the infant probably underlies this mass activity. It may be that "later specializations or individualizations" of this mass activity appear as reflexes and behavior patterns. Of the total mass activity, vocal sounds are a component part. It is out of mass activity and crying that the earliest beginnings of social behavior arise.

Irwin further found a characteristic posture in sleep. The baby's head is turned either to the right or to the left, "the upper arms extend evenly with the shoulders, the forearms being flexed at right angles so that they lie parallel on either side of the head." Generally the legs are slightly flexed at the knees. "Some infants during the first ten days may turn the head consistently to the right, others consistently to the left."<sup>6</sup> In kicking movements the legs are frequently alternated and crudely resemble movements of progression.

The only characteristic vocal pattern observed, aside from coughing, sneezing, and general crying, was a sort of "coughing cry" which was called the "hunger cry because it interrupts continuous crying during the hunger period."<sup>7</sup>

Investigation of the behavior of the newborn infant made by Pratt, Nelson, and Kuo Hua Sun at The Ohio State University<sup>8</sup> showed that sleeping infants are moving 21 per cent of the time, even when protected from external stimuli. When awake they move 42 per cent of the time. These investigators find, as did Irwin, that just after nursing, activity is reduced to a minimum; but as the time for feeding approaches, movements increase in



frequency. Those inadequately nourished were very restless, but with a more adequate diet sleep improved.

Movements of many parts of the body, as well as eye reactions, occur as a result of light stimulations. This "seems to indicate that the sensory elements at birth are so diffusely connected with many other motor elements that when an infant reacts at all it reacts segmentally with various degrees of energy for the different segments."<sup>9</sup>

**Reflexes.**—Visceral reflexes are ready to function at birth. Another response essential to survival which appears immediately is that of nursing. A light touch on the baby's cheek or chin, Watson noted, will cause the baby to move his head so that his mouth will touch the finger. Irwin<sup>10</sup> says that "sucking is a pattern which is highly organized from the first." If the baby had not been recently fed, this response was readily called forth by a light touch about the region of the mouth. Whenever the baby's own fingers "slash by the face or when in its head movements the lips brush against a sleeve or article of bedding," sucking appears. Sucking also appears when there is no external stimulation, especially when the baby is hungry. Irwin suggests that the condition of the membranes of the mouth may evoke this response, which is easily called forth when the baby is hungry. When he is satisfied, however, the response is very difficult to elicit. The most frequent activity at birth seems to be that of sucking; thermal, gustatory, and olfactory stimuli, as well as tactual, release this response.<sup>11</sup> With increasing age the sensory area for sucking appears to become more specific for lip stimulation. The mouth catches and seizes whatever comes into contact with the lips. By the end of the first half hour this suckling response is well coordinated. Difficulty in suckling or with swallowing seems in some cases to have a connection with mental defect. So-called food refusals in infants may at times be due to difficulty in seizing the nipple.<sup>12</sup>

Levy<sup>13</sup> holds that a frequent cause of finger and thumb sucking is an insufficiency of lip exercise, the lip movements in suckling not being vigorous enough to give the requisite exercise to the lips. He suggests that the rational treatment is a prophylactic one and involves the use of methods which would insure sufficient action of the lips during feeding.

The prehensile power of the great toe and the grasping response, or Darwinian reflex, mark the new born. The tiny baby's fingers close over any object that touches the palm of the hand. Immediately after birth this cutaneous response shows itself. That this response is ready to function immediately is indicated by the account of a physician who tells of an instrumental delivery which was made extremely difficult because the forceps, having come into contact with the baby's palms, were seized and held. The pulling away of the object around which the fingers are clasped serves as a stimulus for tightening the clasp.

Watson's records of tests on approximately one hundred babies show the grasping reflex to be present in practically all normal cases. While not all babies will support their own weight, most do so with either hand equally well. This reflex continues more or less perfectly up until the one hundred twentieth day, or even longer, giving way about the time the eye-hand coordination is formed.

Of the babies examined by Peterson and Rainey "some hung on sufficiently to lift the head and shoulders with both hands, some clasped only with one hand, some clasped very lightly, many extended the fingers when the palm was touched, and still others did not react at all."

Watson<sup>14</sup> says that flexion of the infant's toes occurs when a wire or other small round object is placed under them but that "the slightest pressure will release the rod or wire."

There is evidence to show that the disappearance of the grasping reflex gives an indication of the intelligence of the child. A microcephalic boy of twelve months clung so tightly that he could be lifted from his mother's lap. He supported his weight by grasping a rod with the right hand, although the left was placed against the rod. A week later, he hung with the left for two seconds but refused to cling with the right, loosening the grasp as soon as the hand was pulled up as high as his head. The baby was visited once a month until he was twenty months of age. At that time the grasping reflex was no longer elicited, although the hands sometimes closed around the rod, only to loosen when pressure was exerted.<sup>15</sup>

The Babinski reflex, which consists of the bending back of the great toe and simultaneous fanning of the small toes when the

sole of the foot or the inside of the ankle is stimulated, has been regarded as an indication of immaturity of the nervous system. The disappearance of this reflex consequently has been supposed to occur with increasing medulation of the pyramidal tracts. The fact that this reflex is symptomatic of certain diseased conditions of the nervous system lends weight to this view.

Minkowski found this sign in fetuses of from three to four months, and Zador reports that 60 to 80 per cent of normal infants show the Babinski sign. The age of its disappearance



FIG. 3.—This four-weeks-old baby is clinging with both hands; both feet show the Babinski reflex.

and the appearance of the adult and normal—the plantar—reflex (the doubling under of all the toes when the sole of the foot is stimulated) have not been satisfactorily determined. Watson believes that if the Babinski reflex persists much after the first birthday a thorough examination of the whole reflex and instinctive equipment should be made for indications of delayed development. Darwin's son<sup>16</sup> on the seventh day, when the sole of his foot was touched with a bit of paper, jerked his foot away and at the same time "curled" his toes, much like an older child when tickled.

Recent studies have called into question the significance of the Babinski as an indication of maturity of the nerve fibers.

De Angelis found the usual response to be the plantar reflex. Whatever position the toes had assumed at the moment the stimulus was applied tended to be exaggerated. Usually this position is the extension of the great toe and the flexion of the others. In general, the greater the weight and bodily development of the infant the more vigorous are the cutaneous reflexes.<sup>17</sup> The reverse is true of the tendinous reflexes. In the cutaneous and pupillary there is more variability than in the tendinous, which behave more nearly like the adult response. Due to the incomplete development of machinery for inhibiting responses, reflexes in the infant tend to be livelier than in the adult. At birth almost all the reflexes are present. "With patience, waiting for the right moment, one may succeed in eliciting all the reflexes in the newborn." Gesell<sup>18</sup> refers to Minkowski's observation of the "plantar flexion of the toes on brushing the sole of the foot" as early as the fifth month of fetal development.

Bryan reports that in no case was the Babinski elicited during the first day after birth. She found a definite racial difference; the reaction of colored infants was less acute than that of the white and appeared later. Both feet are apt to give the same reaction, but reaction when asleep may differ from that when awake.<sup>19</sup>

The Shermans<sup>20</sup> found that in 75 per cent of the infants examined who first showed the Babinski, the plantar reflex occurred after several stimulations. They regard this as due to summation of stimuli. While a lighter stimulus calls forth an extensor or Babinski response, a deeper stimulus produces flexion, according to Waggoner.<sup>21</sup> At six months extension of the great toe predominates, while "at one year the reaction has become almost entirely that of the adult flexion."

Certain reflexes appear in infancy and later disappear. Some of these transitory reflexes are similar to those of four-legged animals. Under pathological conditions, these primitive reflexes which are normal in childhood may reappear, or they may persist for an abnormally long time.<sup>22</sup>

Among the reflexes that appear and then disappear as development proceeds, Schaltenbrand describes the Moro, which occurs during the first three months of life; it is a "transitory stretching and abduction of all four extremities in response to all sudden

stimuli." Another mentioned is a readiness to jump—"a stretching out of the arms and legs when the body is hanging free in space and is suddenly moved downward."

The findings of observers and experimenters yield differing data regarding appearance and disappearance of reflexes. These differences may be due in part to variation in strength of stimulus, to the use of different stimuli, or to the general condition of the children themselves.<sup>23</sup>

### SENSORY RESPONSES

**Use of the Eyes.**—The eyes may be opened before the body is entirely delivered. If the cornea is touched or a current of air strikes it, blinking occurs, but there is no response to a shadow which rapidly crosses the eye nor to an object, like a hand, which approaches the eye. According to Gesell, "on the first day the child winks at the touch of the eyelash." At birth, blinking can be aroused by touching the face near the eyes; later, the child anticipates the touch by blinking at an object as it approaches the eye. Blinking appears suddenly, the earliest noted by Watson being on the fortieth day, although up until the eightieth day the response was not always called forth. The blinking response invariably occurs at the age of one hundred days if one minute at least elapses between stimulations, according to the Shermans' findings.

The results of Jones's experiments<sup>24</sup> were that blinking in response to a visual stimulus was first elicited at forty-six days; at seventy-six days in half of all the babies examined; in three-fourths at ninety-two days; and by all the babies by the one hundred twenty-fourth day. Hollingworth suggests that blinking in response to a shadow may be a conditioned response. The Shermans<sup>27</sup> report that under the conditions of their experiment, the pupillary reaction was present in normal infants as early as the third hour of age and that from then on it became increasingly adequate both in amount and in rapidity until thirty hours of age, when it functioned without fail. Preyer reports that his son's eyes were sensitive to light five minutes after birth. The infant is not born blind, but his field of vision is limited to a few feet directly in front of him. Not until he is seven or eight months old can he see more than a few feet in front

of him. Preyer<sup>25</sup> describes the development of *seeing* in four steps as follows: staring, looking, following a bright object in motion, seeking for new objects.

The observations of Peterson and Rainey<sup>26</sup> indicate that sensibility to light is present in most infants at birth, even in those prematurely born.

Newborn infants held horizontally will slowly turn the eyes toward a faint light. Jones says that at birth there is no true fixation or following of a moving object. The first movements of the eyelids are incoordinated. Sherman<sup>27</sup> found the newborn infant able to fixate white light, although coordination was poor; perfect coordination was possible at thirty-four hours of age.

Jones's study of the development of coordination of eye movements yielded the following results:<sup>28</sup>

*Horizontal.*—Capacity to follow light moved horizontally developed between the ages of thirty-three and ninety days. The youngest child able to do this was thirty-three days old; at fifty-eight days, half the children tested could do so; at seventy-two days, three-fourths; and by the ninetieth day, all were successful.

*Vertical.*—Capacity to follow light moved vertically developed between fifty-one and one hundred ten days of age. At sixty-five days of age, half; at seventy-eight days, three-quarters of the children studied could do so. By the one hundred tenth day no child failed to respond.

*Circular.*—Ability to follow light moved in a circle developed between fifty-one and one hundred thirty days of age. At seventy-eight days, half; at ninety-one, three-quarters of the children tested could follow the light. By the age of one hundred thirty days, all the children succeeded.

In all cases, horizontal movement developed first, then vertical, and circular last.

*Auditory.*—The apparent deafness of the newborn child may be due to a filling of the middle ear with amniotic fluid instead of with air or to the walls of the auditory canal adhering or being close together. Peterson and Rainey found that at birth "sensibility to sound is quite as apparent as sensibility to light," in both full-term and premature children.

For auditory stimuli, Peterson and Rainey used a metal rattle which produced a "pure sound stimulus," low voice calls and lip sounds, tearing paper, and the falling of a hamper lid. Reactions to the rattle, which occurred from the first to the sixth hour of life, are listed and comprised squirming, crying, starting, frowning, opening eyes.

Although sensitivity to sound is present at birth, appreciation of the significance of sound comes as the result of learning. Darwin describes his son as starting and blinking his eyes upon hearing any sudden sound during the first two weeks. At one hundred twenty-four days he was unable to recognize whence a sound proceeded, nor could he direct his eyes to its source.

Each type of sound seems to have a "stimulating effect of its own," yet the reactions to sound appear to be no more specific than to other stimuli.<sup>29</sup> Although sensitivity to sound is present at birth, appreciation of the significance of sound comes as the result of learning. Immediately after birth the infant reacts to the human voice less frequently than he does to noises, but gradually responses to the voice gain in frequency. As early as sixteen weeks the baby turns his head promptly toward the source of sound. Somewhat later the eyes turn independently.<sup>30</sup> Tudor-Hart and Hetzer found during the first four weeks a rapidly increasing efficiency in hearing. Basing judgment upon responses "to noises, sounds, and the human voice, the four-to-seven-day child heard one and one-half times as well as the zero-to-three-day child, and the two-month child heard two and a half times as well." After the second month not much improvement was observed.

A new test for hearing in the newborn is suggested by Aldrich.<sup>31</sup> That a child who showed none of the usual responses to noises was sensitive to sound was indicated by the development of a conditioned response. At the same time as a bell was sounded the infant's foot was scratched. The characteristic retraction of the foot occurred when the stimulus of the bell alone was given.

**Cutaneous.**—Sensitivity to touch is greatest in lips and tongue. For this reason the child tends to "mouth" whatever comes into his hands. Stern finds the characteristic response to contact to be: for the lips, suckling; for the palm of the hand, grasping; and for the sole of the foot, a drawing up of the legs and stretching

of the toes. The stimulus of a cotton swab applied to the face from the first to the sixth hour of life produced responses of opening mouth, squirming, moving head, contracting lids, moving hands to face. The same stimulus applied to the sole of the foot caused the toes to be extended, withdrawal of foot, toes flexed and then either extended or withdrawn. These investigators found reactions to touch and temperature present in both normal and premature infants. Observation of infants in the bath, exposure to air, etc., indicated that the sensitivity to changes in temperature is present at birth.

Sensitivity to pain was indicated by responses "under conditions of disease, minor operations, etc." This sensitivity, however, is not so "diffusely or so clearly manifested" as in later life, according to Peterson and Rainey. All the infants over seventy-six hours of age tested by Jones reacted to the stimulus of a needle prick on the leg. The number of trials necessary to produce a reaction decreased sharply and readily from one to twenty-one hours and then more slowly and irregularly up to seventy-six hours. When the face was so stimulated all reacted. After forty-one hours of age only one stimulus was necessary. Jones explains the difference in sensitivity in terms of the number of synapses crossed.

**Gustatory.**—The acute sensitivity of infants to gustatory stimuli is familiar to nurses, who find frequently that young babies refuse a strange or different milk.

In both full-time and premature infants, Peterson and Rainey found reaction to salt, sweet, bitter, and sour. A salt solution produced the response of sucking; occasionally, hand movements, crying, or the cessation of crying. Bitter (tincture of gentian) was followed by grimaces, sucking, movements of head and body. Sweet (simple syrup) produced sucking, licking movements, cessation of crying. Sour (acetic acid) gave rise to sucking, crying, grimaces, spitting out. Stern reports that a sugar solution was swallowed; while bitter, sour, or salt produced disgust or refusal.

Solutions of sugar, salt, quinine, water, and citric acid were used as stimuli by Pratt and his collaborators. At the age "of birth-one day there were reactions to 86 per cent of the stimulations; at the age level two to four days, 85 per cent; at



five to seven days, 88 per cent; at eight to ten days, 87 per cent; and at eleven days and older, 81 per cent." These reactions were sucking, movements of the extremities, general body movements, head, facial, mouth, and eye movements.<sup>32</sup>

**Olfactory.**—Olfactory sensitivity is of course difficult to test apart from taste. To various stimuli offered by Peterson and Rainey infants responded by grimaces, sucking movements, squirming. From the results obtained the investigators conclude that both normal and premature infants are sensitive to olfactory stimuli. Stern reports that "newborn children refused to close their lips on a nipple that had been rubbed with any strongly smelling substance." Tayler-Jones tested olfactory sensitivity "with mother's milk on an absorbent cotton pledget held near the nose." If the baby was asleep there was no reaction. If tested near nursing time, "although lying with eyes closed, each baby's nostrils dilated and each mouthed." About fifteen babies tested when asleep with aromatic spirits of ammonia "jumped and drew the head back, cried or blinked, dilated nostrils, and usually mouthed." If they were awake, the head was turned away, they cried momentarily, and usually mouthed. "One-third of them sneezed and one-half brushed the hand across the face. Usually the right hand was used; in one case it was done with the left hand."<sup>33</sup>

Infants' reactions to stimuli in the various sensory fields differ from those of adults, according to the Ohio study. For example, to the experimenters ammonia seemed stronger than the acetic acid, while reactions of infants to both stimuli were about equal. Infants reacted more strongly to the citric acid solution and adults to the quinine.

#### OTHER RESPONSES

**Smiling.**—The baby's first smiles are probably in reality grimaces due to some discomfort. Even when the baby is asleep these grimace smiles appear. A similar contraction of the facial muscles can be elicited by stroking the baby's lips or cheeks. Such a spontaneous or reflex grimace-smile is pretty certain to call forth a smile from the mother or nurse. Through this means the baby develops a conditioned response. This conditioned smile in response to an adult's smile or to clucking sounds appears

during the second month. The results of Jones's experiment show that between the end of the first and third months smiling may be developed in response to stimulation. Half of her cases showed the response at the end of the sixty-eighth day. Her remark to the effect that children reported in biographical studies fall in the more precocious half of the distribution of cases of her study holds true for all other types of response observed.

**Defense Movements.**—The appearance of defense movements occurs during the first few days of life. Watson describes the response to pinching the nose slightly; at the age of four days the baby's hands went up at once and pushed at the experimenter's fingers. When the inner surface of one knee of a day-old child was pinched, the foot opposite was brought up with the regularity observed in the reflex frog.

Typical reactions to lightly pinching the infant's nose were, according to the study made by Pratt, Nelson, and Kuo Hua Sun, "a drawing backward of the head, arching of the back, general restlessness, and non-specific body movements." Holding the arms resulted in few definite "defense" or "rage" reactions.<sup>34</sup>

Sherman found diffuse defense reactions of hands in young infants, although none younger than twenty-one hours of age made successful defense movements, that is, perfectly coordinated movements. Between twenty-one and forty-one hours of age all the infants made coordinated movements; that is, both arms touched the distal part of the examiner's finger with a pushing motion. Some babies succeeded after four trials, others required more, but the average number was twelve. With increasing age, the movement improved until, at one hundred twenty-eight hours, the reaction was fairly regular and accurate with both hands.

**Use of Hands.**—Opposition of thumb and finger first appeared at one hundred eight days, but not before the two hundred sixty-sixth day was it shown by all babies. This response extends over a long period of development. The youngest child to succeed in the reaching test was one hundred sixteen days old, and by two hundred sixty-nine days of age all the babies succeeded.<sup>35</sup>

Lippman, who observed infants four to eighteen months of age in order to determine their ability to grasp 1, 2, or 3 objects,

used Gesell's method,<sup>36</sup> described in his "Mental Growth of the Pre-school Child." He found that at five months of age the average infant was able to grasp a single object. An age difference of two months marks ability to accept the second as well as the first object, while there is an age difference of three months in ability to accept a third as well as a second object.

Not only is the baby subjected from birth to sensory impressions which give him information about the world in which he finds himself, not only is he reacting to that world, but in addition he arouses a multiplicity of reactions of varying degrees of intensity in certain portions of that world. From birth the baby through sensory experiences is subjected to social stimuli. For him those stimuli which proceed from other human beings have a particular potency. Weiss suggests that the baby's first reaction to his social environment is the hunger response and goes on to describe the dual character of infant behavior: (1) biophysical activity which is measured in terms of the degree of coordination between muscles to produce a certain definite effect such as fixating an object or reaching for it; (2) the baby's movements produce stimuli which act upon other individuals so that they in turn react toward the infant.<sup>37</sup>

#### RESPONSES OF THE YOUNG CHILD: SUMMARY

##### I. Before birth.

###### A. Fetal movements:<sup>38</sup>

3d week. Heart activity.

7th week. Movements of arms and legs.

2 months. Reflex movements in response to light touch of the skin.

3 months. Mouth movements as result of lip and tongue stimulation.

4 to 5 months. Trot reflex.

4 to 5 months. Bilateral, symmetrical movements of arms and legs.

5 months. Thoracic movements (regarded as respiratory in character).

5 months. Plantar reflex.

##### II. At birth or shortly afterward.

###### A. Sensory responses.

###### 1. Visual:

Pupillary reflex.

Fixation of light.

Movement of eyeball—either symmetrical or not.

Following of object, in some infants.

2. Auditory.
  3. Cutaneous.
  4. Gustatory.
  5. Olfactory.
- B. Motor responses.
1. Reflexes:
    - Crying.
    - Breathing.
    - Sneezing.
    - Hiccoughing.
    - Yawning.
    - Swallowing.
    - Blinking (upon contact with cornea).
    - Suckling.
    - Grasping.
    - Babinski.
    - Patellar.
    - Pupillary.
    - Erection of penis.
  2. Head:
    - Turning from side to side.
    - Raising.
    - Holding up head.
  3. Hand and arms:
    - Spreading fingers.
    - Opening and closing hand.
    - Moving arms.
  4. Leg and foot:
    - Kicking.
  5. Trunk:
    - Turning over.
    - Stretching.
  6. Arms and legs:
    - Kicking.
    - "Slashing" of arms.
    - Stretching.
    - Turning over.
- C. Emotional responses.
- According to Watson:
- Fear.
  - Anger.
  - Love.
- According to Hollingworth:
- Resistance.
  - Startle.
  - Content.

D. Sensory acuity of premature children.<sup>39</sup>

Visual.

Auditory.

Gustatory.

Olfactory.

Cutaneous.

Organic.

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## CHAPTER V

### MATURATION

The acquisition of adult traits and skills depends upon two factors—growth and learning. These two contributors are progressing simultaneously, and the results of each are interwoven with the results or effects of the other. This interweaving makes it difficult to distinguish the part each plays. Woodworth defines learning as development through exercise, while maturation is that development which comes prior to exercise and is not dependent upon exercise. "Maturation is growth of a structure in response to the diffuse stimulation received from its surroundings, while learning is growth in response to the functioning of that structure."<sup>1</sup>

By the term maturation Gesell<sup>2</sup> denotes "the inherent progressive alteration which tends to bring a growing organism to a state of completeness." It is a less inclusive term than growth, for it designates "those changes which are primarily dependent upon nutrition and duration, rather than extraneous factors." The incorporation of experience into the maturing nervous system comes by way of growth.<sup>3</sup>

"The raw material for learning" is provided through maturation. While various animals are born at different stages of maturation, the human infant comes into the world in an exceedingly immature state, but, as time goes on, through growth and experience he progresses toward maturity. "Experience is not something to which human organization is passively subjected. In response to stimulation it reaches out actively to meet the exciting agent; but it does more than this, it is constantly seeking new contacts." In the development of higher forms of behavior, general motility, the making of excess movements, spontaneous activity, is an essential factor.<sup>4</sup>

Growth is usually regarded as meaning increase of size with increasing age, as, for example, length of leg and size of head, the

appearance of an adult feature, the second teeth. Development, on the other hand, refers not to increasing size of structure but to the perfection of function, to "change of body structure, proportion, and function as the individual grows."<sup>5</sup> The brain grows, but mind develops. In other words, the embryonic brain cells increase in size, and connecting fibers appear. While this growth is taking place the development of capacity of these brain cells and connections to function in thought proceeds. Muscle fibers increase in length and thickness; as growth goes on, the use of the muscle in coordinated or in random movement becomes increasingly possible. In other words, increase in size and increasing function parallel one another; growth and learning mutually affect one another.

Maturity is reached when natural characteristics have arrived at complete development. Both internal and external structures continue to develop until maturity is reached.

The neurones continue to grow, and their synapses in the nerve centers to become closer knit, just by virtue of natural growth; and thus reflex arcs and other reaction machinery, one by one reach the ready-to-use stage during the individual's growing up.<sup>6</sup>

It is the tendency of all human structures to change in the same way with increasing age. Consequently duration is a vital factor in determining development. To quote Gesell,<sup>7</sup> "not only does development require duration, but it defers to it"; and again,<sup>8</sup> "it appears that through growth, experience becomes incorporated into the maturing nervous system."

"In the early phases of the mental growth cycle, the dynamic importance of small units of time is so great that every month witnesses significant increments of behavior." These symptoms of mental growth occur "not hit or miss but in lawful accordance with the time-conditioned mechanics of development." It is "possible to appraise the normality of tempo and trend in the infant's early development"<sup>9</sup> through evaluation of this biological relationship between the small units of age and ordered units of behavior.

The behavior of a child is commonly taken as an index of his maturity. Such remarks as "Don't act like a baby" or "A big boy wouldn't cry when he falls down" or "That child must be at least six months old, you can tell by looking at him" are evidence



that the uncritical observer recognizes the function of maturation in development. The random activity of "the two-months infant is distinct from that of the month old. It is distinctive because it has its own pattern." The fact that "patterns of genetic sequence insure a basically similar growth career for full term, preterm, and post-term infants" seems to indicate that nature has "provided a regulatory factor of safety against stress of extreme variations of environment."<sup>10</sup>

The processes of maturation and of learning parallel one another in time; that is, both processes are going on at the same time. Yet in the development of the growing child they interact and are integrated, so that although each depends upon the other, each facilitates the other. An interesting illustration of this is found in the development of the eye-hand coordination. When the infant lies on his back the ellipses described by his eye movements and by his hand movements do not intersect.<sup>11</sup> When, however, he sits up, these two ranges of movement occur within the same space so that there is intersection. The baby *sees* what his hand *touches*. Learning, therefore, is to some extent dependent upon maturation.

Use of new powers and structures which are enlarged through growth increases or facilitates growth. The muscular development of the acrobat comes through the learning which depends upon practice. It would be impossible, however, to expect to develop such perfection of coordination in a young child. While recent studies in the capacity of adults for learning new things and acquiring new skills compel us to alter our opinions with regard to inflexibility of middle age, we do know that the grace and skill of the ballet dancer can be developed only by training begun in childhood. The flexibility of muscle and tendon of the little child insures grace of movement. This grace can be preserved and increased by practice during the period of growth. When maturity has been reached, however, it is extremely difficult to substitute smoothness and flexibility for the rigidity which has become habitual.

The primary means of distinguishing between the normal and the subnormal is found in innate potentiality for development. This may be diminished through accident or disease but may not be increased.

Development is characterized by an orderliness that is surprising. "It is a law of nature, a law of mental growth, that one performance should precede the other at a certain stage of maturity."<sup>12</sup> The baby does not learn to sit up—he sits up when the neuromuscular system has attained a sufficient degree of development. Yet it is true that random movements of trunk and limbs play a part in the development of readiness to achieve a further step in behavior.

Babies go through "the same stages of development in approximately the same sequence," although the length of the various stages may vary. This length is not shortened by efforts at training, nor is the developmental sequence altered. Appearance of each new stage is sudden, dependent upon maturation.<sup>12a</sup>

Development of the eye-hand coordination depends not only upon maturation but also upon learning in the form of previous practice in fixating objects, in grasping those that come into contact with the palm of the hand, and in drawing the arm and hand toward the body.

The physiological method of education advocated by Seguin overemphasized the effect of practice upon development, because it lost sight of the fundamental fact of innate differences in potentiality which affect rate of development. "Sense training" in terms of increased sensory acuity is no longer regarded as possible. What does happen is that, through experience, increased attention brings about the perception of previously unnoticed differences.

It has been generally conceded that capacity for behavior increases as the medullation of the nerve fibers involved proceeds. Before the nerves are ready to function they become surrounded by a translucent covering, called the myelin sheath, which is assumed at different periods during development, in the various parts of the spinal cord and brain. The study of myelinization of nerve fibers affords strong evidence that the establishing of function in definite fiber systems is paralleled in point of time by the deposition of myelin.<sup>13</sup>

In general, the myelin sheaths are assumed first by the peripheral sensory and motor nerves, thereby completing the reflex mechanism which in man occurs at about the sixth month of prenatal life. Following this the different groups of cells in the spinal cord are associated

by the development of the myelin sheaths on the connecting nerves, thus arranging for association of the reflex actions. Still later the nerves connecting the spinal cord with the cerebellum myelinate, thus completing the mechanism for coordination of movements. Then the afferent nerves, which connect the spinal cord with the brain, assume their myelin sheaths, thus preparing the pathway for sensory impressions. Not until after birth, however, are the efferent tracts connecting the cerebrum and spinal cord myelinated, thus placing the cerebrum in control of the parts below and completing the motor pathway. This late completion of the motor tracts in man explains the great helplessness of the human infant at birth, a condition which is in striking contrast to that in many of the lower animals. It is believed that the assumption of the myelin sheaths in the various association tracts of the cerebrum continues during the period of growth and perhaps until forty years of age. As no brain cells are ever formed after birth, the increasing myelination of the nerve fibers is the chief structural change in the brain that can be correlated with the educational process.<sup>14</sup>

The fovea is not developed until after birth; consequently the eye of the newborn is not ready to function so perfectly as the adult eye. Since the tear glands are not yet mature, tears do not flow.<sup>15</sup> At birth the nerve fibers which control suckling are medullated.

The fibers of the spinal cord and the brain stem are medullated earlier than those of the cerebellum. Movement is unrestrained and purposeless because excitation occurs readily, but inhibition is as yet impossible because of lack of development of the neural structures.

Irwin's study of newborn infants<sup>16</sup> included observation of mass activity, which he defines as<sup>17</sup> "a behavior category which refers to activity involving the whole infant (including all extremities), as opposed to activity involving specific segmental movements." This, he concludes,<sup>18</sup> "is probably the consequence of the neurological immaturity of the infant at birth." This mass activity was a marked characteristic of the infants observed, increasing from the first to the seventh, decreasing on the eighth and ninth, and recovering on the tenth day.

The first week of a kitten's life is characterized by generalized responses and poorly controlled reactions. The acquisition of control over the muscle groups of the forelegs during the third week is paralleled by "a marked proliferation of the fine fiber meshwork of the gray matter."<sup>19</sup>

Tilney found that in brains of newborn kittens only those centers that are necessary for survival are myelinated and functioning. The centers necessary for suckling, meowing, hearing, and paddling about are developed and functioning actively at birth. Kittens are able also to make swimming movements which are similar to the early crawling-approach motion. Nobody would try to make a kitten see or run, let alone teach it tricks, with only those centers functioning, and for similar reasons to demand of an infant or child adaptations beyond its developmental age is equally stupid and doomed to failure.<sup>20</sup> Not until the child is four years old are the fibers which control the sphincters sufficiently mature to insure voluntary control of elimination. Until that time control lies largely in the total situation. In all the psycho-physiological habits, similar breakdowns due to immaturity of the neural mechanism may be observed. Before the neural mechanism is perfected, the function is perfectly performed as long as conditions are propitious.

Another matter of importance to be considered in any study of maturation as related to the development of learning is that skeletal, neural, and muscular structures are all in the process of growth.

When the child's bones<sup>21</sup> and muscles are strong enough for walking, the nerve connections necessary for coordinating the complex movements have also reached an adequate degree of development. Not all the synapses necessary are ready to function perfectly, "and it takes some little time for them to pass from the stage when they will first conduct to the stage when, having grown more, they conduct perfectly"; that is to say, "the neural mechanism for walking can function imperfectly before it can function perfectly." Several weeks of growth are necessary "to pass from the barely functional condition to the fully functional condition; and it is during these weeks that the child seems to be learning to walk, while really his exercise of the partially developed neural mechanisms has no effect except to hasten their growth to some extent."

The process of maturation goes on in spite of handicaps, for the nervous system is "remarkably resistant to adversity, even to malnutrition," and "tends to grow in obedience to inborn determiners whether saddled with handicaps or favored with opportunity."<sup>22</sup>

No.....

"*Anticipations* of acts at a very early date, which only later are performed with facility, are a common characteristic of the development of young children."<sup>23</sup> Koffka's pertinent and most significant observation was called forth by study of Miss Shinn's records of the attempts on the part of her niece to put a rattle into her mouth. On the eighty-sixth day she tried for the first time and on the next day continued her attempt. Yet almost three weeks earlier, on the forty-eighth day, she had six times carried to her mouth and energetically sucked a pencil placed in her hand.

The sudden appearance of a fairly skilled performance or of a capacity for handling complicated ideas is a frequent source of surprise. Young children apparently burst into activities. A more careful observation would, no doubt, have revealed preliminary steps which led up to the completed process. In a study of the way in which children explain unfamiliar phenomena, I Huang,<sup>24</sup> who worked under Koffka's direction, has called attention to this fact. He says that "before a child is ready for a certain performance the seed of experience appears to fall on barren soil." Apparently the child is paying no attention to what is going on, nor does he seem to have any perception of the significance of events. There must, however, be a development of learning which is preparing the way for comprehension. As a result of his experiments I Huang finds that "when the particular performance is not too much beyond his ken, his ability to profit by experience is equally marked."

Learning does not always proceed at a steady pace. Increases in height and weight alternate. The various bodily organs grow at differing rates. Individuals vary in rate of development, and some show greater regularity than others. In the individual, periods of slight development alternate with others of more rapid rate. These periods in which development appears to be quiescent are not, however, periods of stagnation; they "may only be intervals in which development has taken another form. The astonishing advancement often observed in a succeeding period would be quite impossible if the child had not accomplished a considerable amount of preliminary work during the time when he was apparently quiescent."<sup>25</sup> Slight degrees of advancement may remain unnoticed until the accumulation is great enough to be obvious.

A study of early maturation was made by Carmichael, who experimented with salamanders and frogs. Part of the eggs were allowed to develop in clear water and the other part in water which contained an anaesthetic. After some days the control group, that is, those which developed in clear water, swam freely, while those in the drugged water, although they had reached the same stage of development, were quiet. After the anaesthetic had been removed so that the experimental group were in clear water the tadpoles began to swim freely, although the swimming reaction was not perfect at the first trial. In the tadpoles, maturation of both structure and function appeared at the same time. Carmichael concludes that the intricate development of interrelated structures of the nervous system "appears to be determined by functional stimulation within the organ itself. The excitation and response of the elements of the neuromuscular system is itself a part of the growth process."<sup>26</sup>

In further studies Carmichael<sup>27</sup> finds proof of the interdependent influence of the action of hereditary and environmental factors. He states that these two factors may not be equally potent in producing any given result.

Shepherd and Breed found a somewhat more rapid rate of improvement in the groups of chicks whose "training" was delayed, although initial efficiency was low, regardless of length of time for maturing.<sup>28</sup> Although Breed attributes the accuracy of a well-integrated pecking response in chicks to practice, he suggests that improvement may come as a result of a few days' maturing of sensory-motor arcs.<sup>29</sup> Owing to the increased general development of neurones, more perfectly functioning synaptic connections, and the more adequate functioning of sense organs, the older chicks were able to develop the pecking response more rapidly than the day-old ones.

Gesell's study of the readiness of twins to profit by training given at different ages throws into relief the contrast between the effectiveness of teaching given at an earlier age and the speed of learning when maturation is adequate. Identical twin girls were observed from early infancy until they were eighteen months old in order to determine the degree of correspondence in development and the divergence in the development due to training of one of the pair.<sup>30</sup> Their spontaneous response to any

situation was as like as their physical appearance. One of the pair was given a chance to practice climbing a set of five steps. For the first three weeks of practice she had to be helped, but at the end of six weeks when she was a year old she climbed the steps alone with ease and enthusiasm and in twenty-six seconds. At the age of fifty-three weeks the other twin, who had no practice in climbing, took only forty-five seconds to climb the stairway alone. When the twins were fifty-six weeks old the one who had been trained took eleven seconds to climb the steps, while the other one did it in fourteen. The authors say that the twin who had had practice "began to climb stairs with spontaneous enjoyment and without assistance at the age of forty-nine weeks, whereas untrained C. still appeared to linger at the threshold of climbing at the age of fifty-two weeks." The latter, however, "when her time was ripe, climbed the stairs altogether without tuition." The twin who was trained responded to her early training with indifference. "Not until the fifteenth week did she seem in full possession of climbing proclivity." The changes in locomotive behavior are not to be attributed alone to training as such but depend also upon the stage of maturity. The early form of the behavior pattern for climbing was somewhat distinctive in the trained twin because it was grafted on creeping rather than upon walking. It was a creeping upward rather than walking. It would appear that the form, as well as the occurrence, of a behavior pattern is governed by neuro-development, that is, determined by maturational factors.

Although the twin who received training in climbing was given practice also in handling cubes, this early experiment failed to give her any advantage over her sister. "The cube behavior pattern in itself remained true to its inherent form," resembling very closely the behavior pattern of the control twin who was given no special training and who lacked the "emotional satisfaction and social pressure of six weeks" of practice.

This close resemblance in behavior is to be explained only on the basis of intrinsic developmental factors. Maturation plays a dominant part in the development of the ever changing patterns of behavior; ". . . early growth itself brings such a succession of new behavior patterns that there is ordinarily as little scope

for ennui as for crystallization of performance." "There is no conclusive evidence that practice and exercise even hasten the actual appearance of types of reaction like climbing and tower building," for "the time of appearance is fundamentally determined by the ripeness of the neural structures." Apparently the effectiveness of training is defeated by the process of maturation. It is maturation rather than training that is primarily significant. The process of maturation in the child tends to supplant or modify the experience gained through practice.

An investigation of "The Relative Efficacy of Early and Deferred Vocabulary Training" finds that both effectiveness of training in vocabulary and the general pattern of behavior are affected by maturation. Although training is not able to "transcend maturational level," it does influence increase of vocabulary. The control twin began to extend her application of words at an earlier stage of training. At the end of the training period she had reached a higher degree of achievement than her sister; these differences, however, were disappearing during subsequent observation for three months.<sup>31</sup>

"Growth is progress toward maturity. It is, however, a continual and a gradual process, complete at each stage, that is, capable of functioning at each stage." "The duty of the educator is to see that the capacities of each stage are fully realized, not that the stages succeed each other as rapidly as possible."<sup>32</sup>

Effective teaching must wait upon maturity. To attempt to teach the child before he is neurologically ready to learn is to work against heavy odds. It is a waste of the child's time and energy. Through discouragement or irritation, acquisition of the desired skill is hindered. If the child is docile by temperament he may by dint of effort accomplish the task. But the accomplishment is costly of energy. If the child, however, is less docile his refusal to cooperate may appear to be stubbornness. Refusal to respond may be due to failure to understand what is demanded or expected. When S., who came from a well-to-do family belonging to the upper levels of society, first came to the nursery school he was so unresponsive, presented so blank an exterior, that the question as to his intelligence was frequently raised. In point of fact he was a highly intelligent child, but his size



predisposed him to demands beyond his capacity to perform. His bewilderment and lack of understanding appeared to be due to stupidity. At home he was constantly competing with a brother five years older than he and was subjected to a good deal of friendly but embarrassing teasing. As a result of all this, by the age of two and a half, he had developed an almost perfect method of self-protection, namely, the appearance of inability to understand directions and furthermore an appearance of actual deafness.

When he was confronted with tasks suitable to his age and development rather than to his size, he shortly found success to be a pleasant experience and gradually exerted himself to repeat this pleasant experience. For a time it was necessary to expect less than the average child of his age was capable of doing. In the beginning the nursery school staff had attempted to teach him the achievements being accomplished by children of similar age, only to be rewarded by complete inertness on his part. It was at first necessary to reduce his tasks in difficulty, complexity, and length to the level which S. gave himself credit for possessing rather than to the level of his actual capacity. Then as he realized his increasing power, he was willing to attempt more difficult feats. This child's true ability was masked by an inertness assumed in self-defense against demands beyond his capacity to meet.

So-called feeding problems arise at times because the child is expected to acquire at once and at the same time mastery of the technique of eating solid food, a habit of quantity consumption, and skill in handling the utensils of eating in polite society.

When a child has reached a certain stage of development he can do easily and quickly what he could not do even with a good deal of training at an earlier state. Training is even harmful when it is given earlier than the development of the power which it is expected to train.<sup>33</sup> The modern school realizes that since the little child's development is contingent upon his activity of both body and mind, it is completely unjust to demand immobility and, further, that the energy drained off into more or less unsuccessful attempts to achieve immobility could with far greater profit be employed in learning a significant matter appropriate to his stage of development.

If teaching could wait upon adequate maturation, time, effort, and vexation would be saved, while skill and success would be increased. One of the great needs in the experimental science of child development is the accumulation of data which will serve as the basis for determining when a given child is ready to learn a given skill. Age norms are helpful in this. A working guide is the child's interest in, and enthusiasm for, learning a given skill.

The concept of mental age, as distinguished from chronological or life age, is of further help in analyzing what may be expected from a given child. On the other hand, children of equivalent mental age according to a standardized test may vary in capacity for performing certain tasks. Actual length of experience in the world is a factor. The intelligence of a normal three-year-old child is not identical with the intelligence of a feeble-minded adult who also rates as three years mental age.

It is a common experience in working with intelligence tests that individuals who are accustomed to psychological test conditions begin with better scores than do novices. In a study of learning, Kirkwood found, however, that the children unaccustomed to psychological test conditions "began with lower scores but completed the learning in the same number of trials as children of the same mental age who are habituated to the taking of psychological tests."<sup>34</sup>

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## CHAPTER VI

### NORMAL RATE OF DEVELOPMENT

In order to understand the development of learning in the child comprehension of what can be expected of him at different ages is essential. Progress in such understanding is facilitated by the work of those psychologists who through the accumulation of developmental records are making possible the study of cross sections of childhood and are contributing to a knowledge of the sequence of growth.

The earliest developmental records were made of individual children. It was not until the popularity of mental testing had given rise to an understanding of the importance of comparative records and a sufficient amount of data to cover the range of individual variation that developmental norms began to be established. The earlier records, as would be expected from the fact that they were made by parents and relatives belonging to the group of professional people, fall in the upper levels of the norms developed on the basis of responses from a more general and a wider range of subjects. The range of individual differences complicates the difficulty of our comprehension of what may be expected from a given child. Record of performance in test situations, or under experimental conditions, needs to be supplemented by observation of behavior in everyday life. To the accumulation of such data, derived from controlled observation, the nursery school may contribute largely.

The study of developmental psychology involves inquiry into the sequences and the continuity of growth phenomena, that is, both growth and decline, throughout the whole cycle of life. Since it takes time to grow, growth involves lapse of time. It must therefore be true that development is conditioned by duration. Indeed, "infancy itself was evolved to subserve the needs of growth." It is not merely an interval in which growth appears but rather "*a method of growth* by which the potentialities of the life cycle are ultimately realized."<sup>1</sup>

The events of growth and behavior fall into the time sequences which are expressed in terms of age. Age, however, is not merely a dating of events. "Age is at once an orientational and a quantitative category," since any given age always represents a position in the life cycle of the individual. The importance of small units of duration of time is directly related to the age at which they occur. The nearer small units of duration come to the beginning of the individual's existence the greater is their significance. Gesell says that "in developmental economy the value of any given unit of age is quite relative and is dependent upon the secular location of that unit in the life cycle."<sup>2</sup> It is true generally for both physical and mental growth that "the younger the organism the greater is the developmental value of a given unit of time."<sup>3</sup> The true zero of age comes not at birth but at the moment of conception.

The capacity for development is the significant factor in the mental life of the child. The only available measure of such capacity for development is found in the actual performance of the child. In the infant such indications are given by motor responses and the ease with which conditioned responses are established.

In other words, the baby's responses to his environment give evidence of his mental growth and of his capacity for growth. This response to environment has begun even before birth; the child is not altogether inexperienced at birth. The fetus makes spontaneous movements, moves away from pressure and cold applied to the mother's abdomen. Watson's conclusion that learning begins *in utero* seems justifiable. Upon the basis of such learning the newborn child builds his experiences and his learning.

A wealth of stimuli impinging upon his nervous system calls forth the responses of which the newborn is capable. So instant and inescapable is learning that behavior immediately becomes the resultant of native capacity or equipment and of learning. In other words, learning begins before birth and continues as long as the individual is capable of responding to his world.

So inevitable is learning that the acquisition of responses as well as the maturing of tendencies serve as indications of the degree to which the individual conforms to standards of hoped-for development, that is, to the normal.

At birth the infant is able to react to many stimuli; indeed, his primary characteristic is this ability to respond to the world in which he finds himself. These responses provide evidence of his sensory acuity. They are for the most part undifferentiated, diffuse, random movements. Coordination gradually develops. The first muscles to come under control are those of the hands, arms, feet, and legs, which make the grasping reflex possible; and those of the mouth, which are involved in the suckling response. Then comes control of those muscles which turn the eyes and the head; and of the back, which make an upright sitting posture possible.

It is impossible, of course, to arrange the infant's movements in an exact time sequence. Any attempt can at best be only approximate. The range of individual variation seems to be large, or perhaps the wide range of individual variation is merely apparent due to insufficient data.

Knowledge as to what may be expected from a child at a given age or a given degree of maturity would furnish a logical basis for teaching. For the child of school age the justice of this is recognized as shown by the prevalent use of intelligence and achievement tests. With younger children, and with older children in realms other than the academic, however, there is all too little knowledge of what the average child has attained.

The earlier the age at which a child is able to achieve a given coordination or to perform a certain act requiring skill the greater is assumed to be his intelligence. In a study "Early Mental Traits of Three Hundred Geniuses"<sup>4</sup> Cox presents material gathered from biographical accounts of eminent persons, and as evidence of precocious ability she gives such items as the following: John Stuart Mill began to learn Greek at three years of age, at seven was reading Plato, and at nine had mastered conic sections. Jeremy Bentham learned the alphabet before he could talk, at four and five years he was writing Latin and Greek compositions, and by the age of ten he was ready for Oxford. Macaulay read incessantly at three, and after a single visit to the Oxford collection he remembered its items. Mozart composed a minuet when he was five years old. At the age of three, Jonathan Swift could read any chapter in the Bible. For the four-year-old Linnæus flowers were a delight; he wanted to know

the names of the ones that grew in his father's garden. It is reported that when he was on a picnic his questions regarding the names of plants nearly monopolized the pastor's time.

Gesell has selected from Cox's cases certain instances of significant developmental data.<sup>5</sup> At the age of six months Tasso spoke words clearly. Sir Humphrey Davy walked at nine months and before he was two talked fluently. Henry Peter Brougham at eight months spoke several words distinctly. Carlyle at eleven months burst into speech with the question, "What ails thee, Jock?" It is of importance that items remembered about early development so largely concern themselves with speech and verbal fluency.

Diary records made by physiologists, psychologists, and educators yield much information but are open to the criticism that what holds true of one individual is not necessarily true of another. Tests with standardized norms are of great help. Gesell's normative summary, a clinical instrument in the use of which the manner of response is as significant as the actual success or failure itself, offers another basis for comparison.

From these various sources have been selected certain items, arranged according to the age at which the responses may be expected to occur.

#### WHAT MAY BE EXPECTED AT VARIOUS AGES

Any summary of what may be regarded as normal development, any listing of responses according to the age at which they may be expected, must obviously be a statement of average response. Individual variation is great. Any given child may deviate widely from any single listed norm without being in any sense peculiar.

Formulation of such a list is further complicated by the fact that observers who have recorded the performance of children have been working from differing standpoints and with various ends in view. The parent who observes a single child records spontaneous responses to situations which may be called chance or random. Trained investigators have recorded responses of many babies to constant situations, offering specific stimuli. In the third place we have norms as offered by test situations such as Binet's, and "normative summaries" such as Gesell's, which

offer criteria for clinical use. An attempt to blend these three types of data into one group would obscure the issue and would produce a result essentially fallacious.

A series of items selected from reports of individual children is herewith presented. It is incomplete in that not all available records are included. The source of each item is indicated in parentheses. Certain test norms which, to so large an extent, derive their significance from their position in a series and also from the interrelationships between items are transcribed also in order to indicate the range of material available for comparative use.

#### RESPONSES OF INDIVIDUAL CHILDREN\*

##### *2 to 5 Months:*

Showed discrimination between familiar and unfamiliar faces by smiling at former and regarding latter seriously; 60th day (Moore).

Looked at mother and gave cry of joy; 61 days (Preyer).

Father's face made child gay; 62 days (Preyer).

Pleased enjoyment of heat; 8th week (Dearborn).

Accommodation apparent; 9th week (Preyer).

Sound of water arouses attention; 9th week (Preyer).

Head balanced occasionally; 11th week (Preyer).

Sudden turning of head toward source of sound; 12th week (Preyer).

Sat alone (back well supported); 14th week (Preyer).

Eyes followed person moving; 14th week (Preyer).

Strong alternate movements of legs, suggestive of creeping; 3d month (Drummond).

Looked intently at hands; 4th month (Darwin).

Head balanced properly; 16th week (Preyer).

Attempt to seize objects; 118th day (Preyer).

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W. PREYER, The mind of the child, Part I, The senses and the will; Part II, The development of the intellect.

M. SHINN, Notes on the development of a child, *Univ. Calif. Pub. Educ.*, 1893, 1899.

J. SULLY, Studies of childhood; Ch, 11, Extracts from a father's diary.



Joy at seeing image in mirror; 17th week (Preyer).

Recognition of own name; 17th week (Dearborn).

Desire shown by stretching out arms; 18th week (Preyer).

When lying on back lifted himself to sitting posture; 22d and 23d weeks (Preyer).

Tried to seize object brought as near his face as his own hands but made no effort to seize distant objects; 132 days (Darwin).

#### *5 to 8 Months:*

Raised himself to sitting posture; 22d week (Preyer).

"Crowing," a sign of pleasure; 6th month (Preyer).

Sees father's image in mirror and turns to look at father; 24th week (Preyer).

Stretches hand toward his own image; 25th week (Preyer).

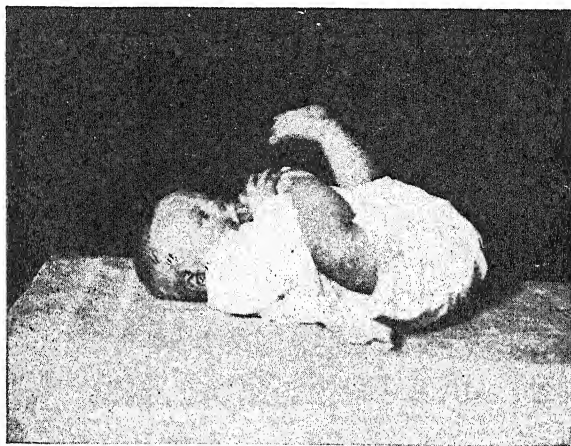


FIG. 4.—A baby of six months puts his toes into his mouth.

Reached for and grasped object held two or three inches beyond his reach; 6 months (Sully).

Voluntarily assumes upright posture when on mother's lap; 28th week (Preyer).

Staring at strange face; 7 months (Preyer).

Child laughs when others laugh at him; 7 months (Preyer).

Sighing appears; 7th month (Preyer).

Gaze turned in direction of falling object; 31st week (Preyer).

Seizing with both hands; 32d week (Preyer).

Grasps feet with hands and carries toes to his mouth with his hand; 32d week (Preyer).

Discomfort accompanied by "square form" of the mouth; 8th month (Preyer).

Cooing; 8th month (Preyer).

Discovered shadow of his carriage and "watched it for half a mile"; 31st week (Moore).

#### 8 to 11 Months:

Associated his own name with image in glass; 9 months (Darwin).

Used tip of forefinger to feel small objects; 39th week (Moore).

Waving (voluntary) of hand for good-by; 39th week (Dearborn).

Stood alone, momentarily; 39th week (Preyer).

Sat alone for appreciable length of time with support; 39th week (Preyer).

When supported so that feet touched floor, alternately lifted and stretched legs; 41st week (Preyer).

Sets feet to moving forward and sidewise; 42d week (Preyer).

Sat alone unsupported and erect; 42d week (Preyer).

Lifts foot high up and puts it forward without crossing over other; 43d week (Preyer).

Objects thrown down are looked at; 43d week (Preyer).

Pleased him to see person leave room, close door, then suddenly open door and reappear; 43d week (Preyer).

Sitting becomes habitual; 44th week (Preyer).

Grasping at flame of lamp; 45th week (Preyer).

Stands alone momentarily; 11th month (Preyer).

Stamps foot; 11th month (Preyer).

Interested in picture book; 11th month (Drummond).

Takes biscuit, carries it to mouth, bites off a bit, chews and swallows it but cannot drink from glass; 11th month (Preyer).

Discriminated between bottles holding water and milk and chose latter; 45th week (Moore).

#### 11 to 14 Months:

Crept; 53d week (Preyer).

Walking, with support; 54th week (Preyer).

New objects no longer carried to eyes but gazed at and felt; 47th week (Preyer).

Hitches along on hands and knees; 57th week (Preyer).

Opens mouth in kissing; 12th month (Preyer).

Throws down objects and looks after them; 47th week (Preyer).

Drinks from glass; 12th month (Preyer).

Observed another baby with interest; 51st week (Moore).

Laughing almost invariably follows laugh of others; 13th month (Preyer).

Gazes at lamp; 58th week (Preyer).

In trying to hold three unlike things in one hand, one always slipped away, yet he did not miss it till he had looked in his hand; 46th week (Moore).

Pretended to gather pictured flowers and smell them; 14th month (Drummond).

*15 to 17 Months:*

Raises self from floor by chair, first to knees and then to feet; 60th week (Preyer).  
Stands few seconds when support is withdrawn; 62d week (Preyer).  
Walks, holding on to support; 63d week (Preyer).  
Walks without support if he thinks he is supported; 64th week (Preyer).  
Walks holding by one finger of another's hand; 65th week (Preyer).  
Runs alone; 66th week (Preyer).  
Ran or trotted around table; 66th week (Preyer).  
Walking becomes mechanical; 68th week (Preyer).  
Stands by himself; 70th week (Preyer).  
Steps over threshold without help; 71st week (Preyer).  
Grasps at candle, puts hand in flame, but only once; 15th month (Preyer).  
Learns to blow out candle; 15th month (Preyer).  
Words "give me a kiss" produce a drawing near of head and protruding of lips; 15th month (Preyer).  
Smell and taste not separated—flower taken into mouth; 16th month (Preyer).  
Caterpillars, bugs, beetles, worms became interesting; 64th week (Preyer).  
Circular movements in drawing; 68th week (Dearborn).

*18 to 23 Months:*

Pointed out picture of father in group photograph; 18th month (Drummond).  
Full spoon carried to mouth with some skill; 18th month (Preyer).  
Learned to go downstairs; 70th week (Moore).  
Combs and brushes hair, washes hands; 19th month (Preyer).  
Walked backward; 79th week (Dearborn).  
Marks on paper; 20th month (Preyer).  
Proximity essential in kissing; 20th month (Preyer).  
Dancing, not rhythmical; 21st month (Preyer).  
Pointing as expression of wish; 90th week (Preyer).  
Orders executed with accuracy; 22d month (Preyer).  
Kiss given as mark of favor; 23d month (Preyer).  
Jumping; 23d month (Shinn).

*2 Years:*

Dancing in time to music; 24th month (Preyer).  
Tries to sing and beat time; 24th month (Preyer).  
Combination of two words into sentence; 24th month (Preyer).  
Moves and handles self well in twilight; 25th month (Preyer).  
Points out objects in pictures and repeats names given; 26th month (Preyer).  
Does not understand "thank you" but thanks himself; 26th month (Preyer).  
Speaks to father and mother as "you" and uses "me" and "I"; 27th month (Sully).

Attempted to jump; 27th month (Drummond).  
Pictures of furniture recognized; 113th week (Preyer).  
Goes on hands and feet; 28th month (Preyer).  
Jumps; 28th month (Preyer).  
Climbs; 28th month (Preyer).  
Personal pronoun used instead of his own name; 29th month (Preyer).  
Climbs stairs alone; 30th month (Preyer).  
Going upstairs; 103d week (Dearborn).  
Stamped rapidly and alternately with each foot as expression of excitement or pleasure; 105th week (Moore).

### 3 Years:

Recognized picture of grandfather 3 years 23 days (Darwin).  
Use of nonsense words; 152d week (Dearborn).  
Pleased with shadow; 40th month (Preyer).

Valuable as these diary records are, they are an inadequate basis for comparison because they are individual instances. While the individual is obscured in the average, the range of variation makes any given individual an unfair sample. Norms are built up by gathering a large number of records; the normal is the average.

Any given performance is insufficient evidence—a series of performances gives a sounder basis for comparison. Such series of performances, if adequately standardized, may be used as a test situation.

**Test Situations.**—The earliest series of situations was formulated by Binet to use in work with school children in Paris. Binet formulated also a series for infants.

### BINET TESTS

#### 3 Months:

1. Child should be able to support head when held upright.
2. Attention should be held for five seconds while rattle or bunch of keys is shaken in front of face.
3. Child should wink when hand is passed rapidly six inches in front of face.

#### 6 Months:

1. Child should sit alone.
2. Turn head at sound of dog whistle.
3. Reach for bright object dangled in front.

*9 Months:*

1. Creep or move about.
2. Without touching him, mother should be able to make him smile while he sits alone.

*12 Months:*

1. Child should stand alone.
2. Mother should be able to make him repeat at least one word.

*2 Years:*

1. Child should imitate mother when she puts her hands on top of her head or folds her arms.
2. Child should be able to point out simple objects in a picture.

*3 Years:*

1. Child should be able to name objects in picture.
2. Point to nose, mouth, and eyes.

*4 Years:*

1. Names objects such as keys, watch, ball.
2. Repeats three digits.

*5 Years:*

1. Counts four pennies.
2. Repeats such sentence as: This doll has bright yellow hair.

These norms stated by Binet have been modified and restandardized by many investigators. One such reformulation is quoted below.

MODIFICATIONS OF KUHLMANN TESTS<sup>6</sup>*3 Months (Credit 1 Month Each):*

1. Control of eyes (both eyes look in the same direction. Follows with eyes movement of bright objects).
2. Hearing (reacts with sudden start or scream to loud noises, such as slamming the door, hand clapping. Turns eyes or head in direction of less startling noises, such as opening of door, footsteps).
3. Muscular control (moves hand or toy directly to mouth without striking other parts of body or face. Grasps or curls fingers about rattle or pencil placed in hands).

*6 Months (Credit 1 Month Each):*

1. Muscular control (balances head without support. Sits ten minutes or more when supported).

2. Self-direction (attempts to catch self when beginning to fall from sitting posture. Reaches out for toys and nearby objects. Attempts to pull self to sitting posture if given a hand to grasp).
3. Enjoyment (plays longer and more persistently with one toy than with another. Laughs aloud when bounced on bed or when familiars indulge in strenuous exercise).

1 Year (Credit 1 Month Each):

1. Imitation of movements (can learn in half-dozen trials to wave "bye-by," put hands above head, or hide face in hands).
2. Locomotion (creeps toward desired objects or stands beside chair without other assistance).
3. Understanding (looks at frequently observed objects when names are mentioned: dog, ball, mamma, flowers).
4. Obedience (understands and usually obeys simple commands: "Lie down"; "No, no!"; "Spit it out!").
5. Speech (repeats simple syllables: "Go, go"; "Da, da"; "Ma, ma"; "Bye-by").
6. Calls attention (shouts exclamations, looks or even points to objects of special interest: dogs, cats, train, carts, etc.).

2 Years (Credit 2 Months Each):

1. Speech (names articles of food desired: milk, cracker, rice, etc.).
2. Pictures (points out familiar objects: boy, dog, cat, cow, man).
3. Obedience ("put the ball in basket"; "Close the door"; "Bring the ball").
4. Imitation (imitates actions of other children at play).
5. Discernment (removes wrapping from candy; opens sack to get cookies).
6. Self-direction (walks directly to desired locations; rides "kiddie-kar" forward).

While the brevity of the various forms of the Binet series lends them an appearance of simplicity and definiteness, their incompleteness makes them inadequate measures of development. Gesell has formulated a series of normative summaries which is more nearly complete and at the same time avoids the fallacious implications of numerical evaluation in terms of mental age. These normative summaries have a further advantage in that they provide a basis for comparison derived from clinical experience.<sup>7</sup>

In 1916 Simon published a Questionnaire for the Observation of a Young Child from Birth to Two Years, which was translated by Reymert.

# QUESTIONNAIRE FOR THE OBSERVATION OF A YOUNG CHILD FROM BIRTH TO TWO YEARS OF AGE<sup>s</sup>

## I. Sight.

Does the child's look indicate a vague contemplation? (First day.)

Does it fix its eyes habitually on the ceiling? (First days.)

Is it possible to bring about a convergence of the eyes upon an object? (7th day.)

Do the child's eyes follow:

a. A white paper or a lighted match moved slowly before it from one side to another? (30th day.)

b. An object that moves back and forth? (3d month.)

c. The displacement of a person to another place? (3d month.)

d. A ball that is thrown?

e. The flight of a bird?

f. Are the eyes constantly exploring? (3d month.)

g. Does it detect a thread? A hair? (8th month.)

## II. Audition.

Is the child aware of:

The human voice? } (15th day.)  
A sound?

Does it turn its head toward a sound—dog or bell? (3d month.)

Does it search for the one calling it? (3d month.)

## III. Recognition.

Does the child respond in a special way:

a. To the face of the mother? (3d month.)

b. To a familiar voice?

c. Does it manifest joy over the preparations for taking it out? (5th month.)

d. Does it manifest astonishment:

a. By seeing itself in a mirror? } (7th month.)  
b. Before a picture of its parents?

Is its attention fixed?

Does it become curious (eyes and mouth wide open) about a stranger? (7th month.)

Does it turn with curiosity when it hears a door being opened? (8th month.)

Does it examine (with lips pressed together) the object just being grasped? (9th and 10th month.)

Do the eyes follow an object which the child drops? (9th to 10th month.)

Does it observe *acts in series*? (the preparation of its meal for instance)? (12th month.)

Can it pick out among general photographs the photograph of a certain relative? (12th month.)

Does it put out its hands?

Does it try to put pictures it has seen, together to make a book? (12th to 18th month.)

Does it no longer try to take the faces or the figures which it sees from a book?

#### IV. Affective manifestations.

Does the child make grimaces when its face is touched by a little cold water? (1st days.)

Does it open its eyes with pleasure and spread its fingers apart upon being given a warm bath?

Does it show its joy by timely movements?

##### A. Sympathy.

Does the child smile back?

Does it laugh audibly? (8th month.)

Does it laugh when one is laughing near by? (10th to 12th month.)

##### B. Desire.

Does it merely open its eyes and advance its lips? (7th day.)

Does it express its desire by outstretched arms? (5th month.)

##### C. Fright.

If one approaches one's hand to the child's eyes in a threatening way, does it raise its arm? (3d month.)

Does it recognize a grouchy expression in a face (does it draw the corners of its mouth or does it start to cry)? (6th month.)

Do its arms tremble at a sudden noise? (30th day.)

Does it nearly wink its eyes at a sudden noise? (8th month.)

Does the contact of a feather or a hair make it withdraw its hand? (8th month.)

Is the child afraid of animals that it has never seen before? (12th to 18th month.)

Is the child afraid of:

1. Black clothing?

2. Hands with gloves on? }

3. Changes in dress? }

(12 to 18th month.)

#### V. Motor activities.

If one touches the lips of the child with the finger, does one get sucking as a response? (1st days.)

Will blowing lightly on the one or the other of the child's eyes call forth the closing of the eye? (1st days.)

If one touches the tip of the nose of the child, will the eyes close? (1st days.)

If one touches one of the nostrils, what is the response of the eye on the same side? (1st days.)

Will a light tickling on the sole of the foot provoke the spreading and extension of the toes? (1st days.)



Will a stronger rubbing of the sole make the child withdraw the whole foot? (1st days.)

Are the movements coordinated? (1st and following days.)

Do the fingers show slow and indefinite contractions? (1st days.)

Does the child show slow and partial puckering of the lips? (1st days.)

A. Grasp.

If one puts a finger in the palm of the child's hand, does it close the hand? (1st days.)

Does the child try to grasp objects presented to it, and, if failing, does it seem to renew its efforts? (5th month.)

Does the child try to grasp at the same time both the object and the base on which it rests? (7th to 8th month.)

Does the child get hold of the object thrown to it, right away on the first trial? (9th and 10th month.)

Does it grasp small objects between the thumb and the index finger? (12th month.)

Can it get a foreign object (a piece of bread, for instance) out of its mouth again (by hand)?

B. Carriage of the head.

Does the child's head have just a chance balance?

If one puts it erect, for how long a time can the child keep its head erect? (4th month.)

C. Sitting position.

Does the child raise its head from the pillow? (3d month.)

Does it succeed in lifting its body in the cradle? (6th month.)

Can the child *sit* with the help of a pillow? (8th month.)

Can it sit without any assistance? (11th month.)

D. Walking.

Held under the arms, with the feet touching the floor, does it make alternating movements of the feet, crossing one over the other and placing one foot upon the other?

Or does it place its feet properly while still making exaggerated flexion? (9th to 10th month.)

Does the child creep around the floor? (9th to 10th month.)

Can it stand erect for an instant without support? (11th month.)

Can it rise, by the help of the nearest support? (12th to 18th month.)

Does it take several steps if one holds it by the hand?

Can it rise without support? (12th to 18th month.)

Does it walk alone?

1. Too quickly with its head leaning forward? (18 months to 2 years.)

2. Rather slowly but able to reach the goal? (10 months to 2 years.)

Does it climb a step without aid?

E. Activities (properly so called).

Does the child imitate the farewell gesture with its entire arm?

- Does the child carry things to its mouth without fumbling? (9th to 10th month.)
- Does it amuse itself by banging objects against one another or upon the table or its chair? (9th to 10th month.)
- Does it still drop its toys? (End of 1st year.)
- Does it occupy itself: (End of 1st year.)
- By splashing water?
  - By filling and emptying small boxes?
  - By putting on a paper hat?
  - By hiding its ball in play?
- Can it put its tongue out at a person? (End of 1st year.)
- Does it return a handshake? (12th month.)
- Does the child imitate: (12th to 18th month.)
- Sewing?
  - Writing?
  - Crossing the arms?
  - Coughing?
  - Sucking?
  - Reading?
  - Feeding (dolls and animals)?
  - Sweeping?
  - Brushing?
- Does it aid in setting the table? (12th to 18th month.)
- Does it aid in the housekeeping? (12th to 18th month.)
- Can it:
- Blow out a candle?
  - Put a cork in a bottle?
  - Open and close a door?
  - Blow on a trumpet?
  - Draw a string up to itself by using both hands alternately?
  - Put a coin into the opening of a "savings bank"?
  - Unscrew a cover?
  - Salute (bowing)?
- Does the child try to dress itself alone?
- Does the child try to eat alone with a spoon and how does it manage? (18 months to 2 years.)

## VI. Language.

Babbling.

Crowing.

Vowels.

Consonants. } Recognized? When?

Syllables. }

### A. Monologues:

"Rara-o-go-aggege." (5th month.)

"Brrr-ha." (6th month.)

## B. Comprehension.

Does the child respond when its name is called? (12th month.)

Where is: (12th to 18th month.)

1. The head?
2. The lamp?
3. The door?
4. Papa?
5. Your hat?

Where are papa's eyes? (18th months to 2 years.)

Where is little sister's (or mama's) hair?

Where is your nose? Where is mine?

Where is your ear? Where is the other?

Cross your arms?

Pick up this or that object.

Fold your napkin.

Give me your drinking glass.

Take the handkerchief which is on the table and put it on the chair.

## C. Repetition.

Say after me: (18 months to 2 years.)

Ma.

Pa.

Dada.

Lolo.

Painpain.

Du lait.

Un auf.

Soulier.

Gâteau.

Citeau.

Cheval.

Mouville.

Pantalon.

Chocolat.

## D. Language in a narrower sense.

Does the child express its desire by infinitives or substantives?  
(18 months to 2 years.)

Does it express its judgment by a single word (warm, for instance)?

Does it designate animals by the imitation of their cry or by their names?

What is your name? (18 months to 2 years.)

What is this? (Object shown is a chair, for example.)

What is the use of this?

What does ——?

Do you want ——?

(States if response is yes or no.)

Under the direction of Furfey at the Catholic University of America, A Scale for Measuring the Mental Development of Infants during the First Year of Life was standardized by Linfert and Hierholzer.

# A SCALE FOR MEASURING THE MENTAL DEVELOPMENT OF INFANTS DURING THE FIRST YEAR OF LIFE<sup>9</sup>

## PERCENTAGE OF SUCCESSES IN TESTS BY VARIOUS AGE GROUPS.

### SERIES I

Test	1 month	2 months	4 months
1. Rolls to side.....	6	10	58
2. Rolls from side to back.....	36	78	94
3. Raises head.....	78	78	96
4. Notices ball on string.....	62	90	96
5. Follows ball with eyes.....	52	68	82
6. Follows ball with head.....	14	36	64
7. Notices blue ball.....	58	76	96
8. Follows blue ball with eyes.....	48	66	76
9. Follows blue ball with head.....	20	26	56
10. Grasps ring in hand.....	62	76	98
11. Puts ring in mouth.....	0	2	30
12. Distaste for salt.....	50	74	98
13. Distaste for salt with adaptation.....	12	24	50
14. Reaction to feather drawn across soles.....	68	80	84
15. Reaction to picture 1.....	36	48	80
16. Reaction to picture 2.....	74	74	96
17. Reaction to picture 3.....	58	76	94
18. Head held erect and firm.....	30	34	46
19. Articulation tests—Eh.....	16	36	84
20. Articulation tests—Eeh.....	16	8	40
21. Articulation tests—Ooh.....	8	26	54
22. Reaction to table edge.....	10	24	84
23. Regards teaspoon held quietly, then flourished.....	4	10	36
24. Resists removal of rod.....	60	82	90
25. Grasps thumb.....	88	94	98
26. Toe reflex—extension.....	22	44	54
27. Socially stimulated smile.....	60	82	100
28. Attention to voice.....	90	92	98
29. Clasps cube.....	10	16	66
Mean.....	38.3	51.0	73.3

## PERCENTAGE OF SUCCESSES IN TESTS BY VARIOUS AGE GROUPS.

## SERIES II

Test	6 months		9 months		12 months	
	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent
1. Rolls from stomach to back.....	50	76	50	100	50	100
2. Rolls from back to stomach.....	50	70	50	100	50	100
3: Sits alone.....	50	36	50	100	50	100
4. Lifts head and limbs when prone.....	50	10	50	97	50	100
5. Propels body when prone.....	50	42	50	100	50	100
6. Creeps.....	49	19	50	71	50	88
7. Climbs.....	50	0	50	0	50	90
8. Makes stepping movements.....	50	6	50	75	50	100
9. Stands with help.....	50	10	50	92	50	100
10. Stands alone.....	50	0	50	37	50	84
11. Walks with help.....	50	0	50	37	50	94
12. Walks alone.....	50	0	50	0	50	30
13. Pats table.....	48	56	50	98	50	98
14. Perceives pellet.....	46	39	49	100	49	100
15. Reaches for ribbon.....	37	12	40	98	49	100
16. Unwraps cube.....	50	0	50	68	50	59
17. Builds with blocks.....	50	0	50	2	34	38
18. Seeks fallen spoon.....	50	48	50	92	50	100
19. Rattles spoon in cup.....	50	0	45	35	49	31
20. Plays peek-a-boo (pat-a-cake).....	50	0	50	83	49	94
21. Recognizes name.....	48	65	50	100	50	100
22. Knows animals.....	47	29	50	95	50	92
23. Recognizes travel preparations.....	40	40	50	98	50	96
24. Salutes.....	50	0	50	45	50	94
25. Says "mama" or "dada".....	49	25	50	94	50	91
26. Says "bye-by".....	50	0	50	20	50	56
27. Says more than one word.....	50	0	48	47	50	64
28. Repeats words.....	50	0	50	0	50	6
29. Comprehension.....	50	0	50	80	50	100
30. Inhibits forbidden acts.....	50	0	50	0	48	50
31. Uses spoon.....	50	0	50	8	49	44
32. Removes shoes.....	50	0	50	4	50	50
33. Controls bowels.....	50	0	50	2	50	40
34. Controls bladder.....	50	0	50	0	50	18
35. Asks for things.....	50	0	50	0	50	54
Mean.....	..	16.7	..	56.5	..	76.0

## SMOOTHED AGE NORMS

Age, Months	Per Cent Success
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## Series I

1	38
2	50
3	62
4	74
5	86

## Series II

6	20
7	30
8	40
9	50
10	60
11	70
12	80

Another series or scale has been developed by Charlotte Bühler.

BÜHLER'S TESTS FOR THE FIRST YEAR OF LIFE<sup>10</sup>

<i>S</i> —social development.	<i>M</i> —mental ability.
<i>B</i> —bodily control.	<i>O</i> —manipulation.

*2 Months.*

- S* 1. Response to adult's glance.
- B* 2. Holding the head erect.
- B* 3. Holding the head up in the prone position.
- B* 4. Head movement of flight.
- M* 5. Fright at a loud sound.
- M* 6. Searching head movements during prolonged sound.
- M* 7. Focusing on an object.
- M* 8. Reaction to changing tone of voice.
- O* 9. Cooing.
- O* 10. Experimenting movements.

*3 Months:*

- S* 1. Returning the glance with smiling or cooing.
- B* 2. Holding the head and shoulders erect in the prone position.
- B* 3. Flight movements of the whole body in response to tactile stimulation.
- M* 4. Looking for the source of a sound.
- M* 5. Following moving objects with the eyes.

- M* 6. Changed reaction upon repeating the presentation of an auditory stimulus.
- M* 7. Reaction to the disappearance of the human face.
- M* 8. Mask test.
- M* 9. Imitating facial movements.
- O* 10. Feeling of objects (active touch).

4 Months:

- S* 1. Expression of displeasure when adult stops playing with the child.
- B* 2. Lying supported only by the palms of the hands.
- B* 3. Grasping with both hands without using the fingers.
- B* 4. Grasping a touched object.
- B* 5. Diaper experiment in lying position.
- M* 6. Active looking about in a new situation.
- M* 7. Positive reaction to light.
- M* 8. Looking at an object while moving it.
- M* 9. Imitating facial expressions.
- O* 10. Manipulatory movement of an object.

5 Months:

- S* 1. Reflecting friendly and angry facial expressions.
- B* 2. Holding the head and shoulders high in the dorsal position.
- B* 3. Turning from back to side and back again.
- B* 4. Grasping an object in view with one hand.
- B* 5. Diaper experiment in dorsal position.
- M* 6. Positive reaction to sounds.
- M* 7. Reaction to the withdrawal of a toy.
- M* 8. Looking for a lost toy.
- M* 9. Imitating facial expressions.
- O* 10. Defense reaction to the withdrawal of a toy.

6 Months:

- S* 1. Actively seeking contact.
- S* 2. Distinguishing between friendly and angry talking.
- B* 3. Sitting with support.
- B* 4. Diaper experiment in prone position.
- B* 5. Table-edge test.
- M* 6. Displeasure at unsuccessful grasping.
- M* 7. Smiling as a general reaction.
- M* 8. Expectation in response to the repetition of a stimulus.
- M* 9. Imitating sounds.
- O* 10. Manipulation on a stationary object with a moving object.

7 Months:

- S* 1. Distinguishes between angry and friendly facial expressions.
- B* 2. Locomotion.

- B 3. Diaper experiment in the supported sitting position.
- B 4. Moving toward a desired object by changing the position.
- B 5. Pushing away a stimulus.
- M 6. Loss of interest in a repeated stimulus.
- M 7. Imitating knocking.
- O 8. Taking a toy away from an adult.
- O 9. The paper test.
- O 10. Manipulating and moving two objects.

8 Months:

- B 1. Sitting alone.
- B 2. Crawling.
- B 3. Reaching for an object outside the crib.
- M 4. Neutral reaction to single stimulus.
- M 5. Mirror test.
- M 6. Reaction to strange surroundings.
- M 7. Imitating squeezing the doll.
- M 8. Persisting reaction to withdrawal of toy.
- M 9. Deliberate choice of toy.
- O 10. Preferring paper to other objects.

9 Months:

- S 1. Becoming accustomed to a strange adult.
- S 2. Arousing an adult's attention.
- S 3. Understanding gestures.
- S 4. Playing cuckoo.
- B 5. Kneeling with support.
- B 6. Grasping two objects while sitting alone.
- M 7. Curiosity for that which is hidden.
- M 8. Imitating opening and shutting the picture book.
- M 9. Pocket test.
- O 10. "Destructive" activity.

10 Months:

- S 1. Turning in astonishment to an adult.
- S 2. Organized play with an adult.
- B 3. Standing with support.
- B 4. The diaper experiment while sitting alone.
- B 5. Throwing objects.
- M 6. The glass-plate test.
- M 7. Imitating ringing the bell.
- M 8. Memory test.
- M 9. Uncovering a covered object.
- O 10. Opening a box.



11 *Months:*

- S* 1. Organized play with an adult.
- B* 2. Rising to the sitting position.
- M* 3. Memory test.
- M* 4. Imitating beating two spoons together.
- M* 5. Imitating sounds.
- M* 6. Fear of the unfamiliar.
- M* 7. Pulling an object by its string.
- O* 8. Careful handling of a block.
- O* 9. Fitting hollow blocks into one another.
- O* 10. Opening a box.

TESTS FOR THE SECOND YEAR OF LIFE<sup>11</sup>*Series I. Tests 1; 0-1; 2 (+29)*

- S* 1. Organized play—getting up and lying down.
- B* 2. Holding something while standing with support.
- B* 3. Holding something while walking with support.
- M* 4. Observing his image in the mirror.
- M* 5. Grasping at the reflection of a cracker in the mirror.
- M* 6. Searching for the vanished contents of a box.
- M* 7. Recalling the chicken.
- M* 8. Imitating squeezing the ball to make the chicken come out.
- O* 9. Rubbing or knocking two sticks together.
- O* 10. Taking a nest of blocks apart and putting them together again.

*Series II. Tests 1; 3-1; 5 (+29)*

- S* 1. Organized play with a ball.
- S* 2. Understanding a demand.
- B* 3. Walking alone.
- B* 4. Picking something up while standing alone.
- M* 5. Looking at a colored "picture."
- M* 6. Turning to an adult in astonishment at mirror-image.
- M* 7, and 8. Recalling the chicken and the contents of the box.
- M* 9. Imitating drumming with two sticks.
- O* 10. Putting blocks back into the box.

*Series III. Tests 1; 6-1; 8 (+29)*

- S* 1. Understanding a forbidding.
- B* 2. Holding something while walking alone.
- B* 3. Climbing.
- M* 4. Searching for the reflection behind the mirror.
- M* 5. Finding and taking a cracker from under one of two boxes.
- M* 6, and 7. Recalling the chicken and the contents of the box.
- M* 8. Startling at sight of the spinning top.

*M* 9. Reaching an object by means of a stick.

*O* 10. Respecting the work of another.

*Series IV. Tests 1; 9-1; 11 (+29)*

*S* 1. Interested observance of the mask.

*S* 2. Understanding a command.

*B* 3. Climbing up on to a chair.

*M* 4. Recognizing a picture.

*M* 5. Putting a watch to his ear upon command.

*M* 6, and 7. Recalling the chicken and the contents of the box.

*M* 8. Imitating grinding the music-box.

*O* 9. Fitting two hollow sticks into one another.

*O* 10. Placing blocks on top of one another.

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## CHAPTER VII

### LEARNING TO CONTROL THE BODY

The word "infancy" carries the idea of a period devoted to learning, to the acquisition of skill, as well as to growth. When the young animal has mastered control of its own body it is only a comparatively short distance, in point of time, from birth. Its motor capacities at birth are nearer to adult achievement than the human infant's, and, in addition, the possible level of attainment is far less extended and intricate. The child's mastery of its body, however, is extended over a long period of time; complete control is acquired by the human being only after a long period of learning.

Increase of control does not perfectly parallel increasing body size, nor is approximate perfection of control attained by all adults. Clumsiness, awkwardness, and lack of grace, as well as lack of dexterity, may mark the adult, quite irrespective of attainment of adult form and proportional size. The present-day interest in aesthetic dancing, with the accompanying emphasis on rhythm and freedom of expression, asserts an undying faith in and hope of the possibility of developing perfect control of the body. The child's delight and satisfaction in increasing control are revealed not only by the repetition of a successful series of movements but also by his pleased comments regarding his skill and that of his contemporaries.

### INTERRELATIONSHIP BETWEEN MATURATION AND DEVELOPMENT

The process by which the random movements of the young baby become coordinated, purposeful, and habitual is both long and intricate and, as has been previously shown, depends upon the maturation of the nervous system. This acquisition of body skills proceeds by apparently abrupt gains after intervals of seemingly little or no progress rather than by regular and observable increments.

Gesell's studies of the relationship between maturation and development include an investigation of the stages of prehension of a pellet. These genetic<sup>1</sup> stages proceed from no regard through visual regard, later accompanied by hand approaches, through increasingly expert finger movements to "perfection and further delimitation of pincer-like responses."

Effectiveness of direct teaching must wait upon an inner process of maturation. Reference has already been made to Gesell's discussion of the relative effectiveness of training and maturation in identical twins. At the age of sixty weeks, development made the untrained twin equal in performance to the twin that from the age of forty-six weeks had received training and practice in stair climbing.<sup>2</sup>

### READINESS FOR LEARNING

Ideally, direct teaching of motor skills would wait upon the child's readiness to master a given performance. As things actually fall out, however, teaching all too often precedes development of capacity, and as a consequence time, energy, patience, and interest are lost both by child and by teacher. Information regarding the child's readiness to learn is so scanty that most of the teaching is in reality trial and error teaching.

To complicate matters the child's interest in the acquisition of a given skill is intermittent. One day he is all eagerness to do something for himself and refuses help, preferring his own blundering movements to submitting to aid. This may suddenly, and for no reason at all so far as the observer can see, be changed not only to indifference but to complete refusal to make any effort at mastering the process.

Undoubtedly this apparently willful and inconsistent behavior has its roots in the stage of development of the child. Another obstacle in the acquisition of skills according to the adult standard of method and convenience lies in the child's loss of interest when an activity has ceased to challenge his complete attention and to tax his powers, although adult standards of skill and speed have not yet been attained.

### DEVELOPMENT OF BODY CONTROL

Study of the process of development of body control will throw light on these problems and will provide a basis for under-

standing and appreciation of a given child's degree of development.

It is the capacity of the organism to respond to stimulation that makes acquisition of skill possible. Although development of body skill involves primarily the perfection of motor coordination, such motor coordinations as are not purely reflex in their nature are initiated as the result of stimulation of more than one sense organ. Random movements are excited by visual, auditory, or tactual stimulation. It is through practice that various sensory impressions become so combined and integrated that they function satisfactorily in producing coordinated, purposeful movements.

The dependence of development of body skill upon a varied sensory experience is illustrated by the case of Kaspar Hauser,<sup>3</sup> who was found near Nuremberg in 1828. Although he was apparently sixteen or seventeen years old and was four feet nine inches in height, he "scarcely knew how to use his fingers or hands, and his attempts at walking resembled the first efforts of a child." According to a letter which he held in his hand, he had been brought up in the house of a poor laborer, from which he had never been allowed to stir. After the boy had been taught to talk, he said that he had lived in a small, dark cell and had never seen the sky or the face of the person who brought him bread and water. Tredgold cites this individual's lack of development as an illustration of the "effects of a prolonged isolation upon the cells of the brain."

The interplay of sensory stimulation and motor response brings about the growth of bodily control. Even before birth the foundation for complete development of bodily control has been laid in sensory experience and in movement. Fetal movements are of varied sorts: passive, that is, transferred to the fetus by means of the abdominal wall of the mother or excited by various poisonous substances circulating in the blood stream which nourishes it; reflex, as hiccough; or impulsive, such as spontaneous stretching movements.<sup>4</sup> Preliminary practice for walking is provided by the baby's turning over; kicking, first with both legs and then with each leg alternately; raising his head from the pillow; lifting his shoulders as well as his head; pulling himself to a sitting position; rising to a standing position; taking

a few steps while he holds on to something; then stepping alone; then running. Certain motor coordinations appear at birth or shortly after and function without preliminary practice. These responses have been briefly described in a preceding chapter.

Further information regarding the increase of control is provided by Halverson's<sup>5</sup> study, in which he found that the "crudely functioning hand at the end of a poorly directed arm" gradually develops into "a well-coordinated arm under the directing influence of a pretty well-developed prehensile organ." In grasping a "crude palming movement," "a clawing type of closure" in which thumb and forefinger are the predominating factors, yields to a "refined finger-tip grasp which includes precise placement of the digits upon the cube."

**Locomotion.**—At birth or very shortly afterward the baby makes vigorous random arm and leg movements; he squirms, draws up the legs, and pushes them out again. Tayler-Jones<sup>6</sup> speaks of the "walking phenomenon" in the day-old baby who, "if held under the arms and lowered so that the toes touch the table, pushed on it with a walking motion." She quotes also Bauer's observation of the "crawling phenomenon in the newborn." "A baby, if placed on the abdomen and pressure is made on the soles of the feet, moves forward, the arms taking part." This persists until the age of four months.

The "postural and locomotor development" of twenty-five babies for a period of two years was studied by Shirley.<sup>7</sup> All babies kick vigorously, but it is the smaller ones who turn and roll. While it is difficult to trace exactly the progress of the baby, development is orderly, begins at the head, and proceeds down the neck and trunk to its legs. "When postural control has progressed as far as the mid-trunk region," that is, "at about the age the baby meets the criterion for sitting on the lap," the baby is able to reach and to grasp objects. Sitting alone involves the entire trunk and is achieved when control of the shoulders is followed by control of the lower part of the trunk. Then the legs are straightened for standing. Brainard<sup>8</sup> reports that the first vigorous leg movements were noticed on the third day. After the baby had been crying the legs were pulled up toward her body and then pushed out again. At the age of three months

and six days when the bottle was held toward her she raised her feet and grasped the bottle with the feet.

The same author outlines the primary responses involved in walking as follows:<sup>9</sup> pushing against pressure brought to bear on soles of feet; alternate leg movements; balancing by reverse movements when losing support; random movements excited by visual, auditory, or tactual stimulation. All combinations of these primary movements are secondary, that is, acquired by practice. It is, however, upon balancing with the muscles of the body rather than upon movements of the legs that walking depends.

Another study of walking shows that there are four fairly well-defined stages in learning to walk: (1) prancing or striding by means of which the baby covers at least the distance of a meter, although he does not support his own weight; (2) standing with support, during the one-minute interval the baby bears his weight but does not move out of his tracks; (3) walking when led by the experimenter; (4) walking alone, usually preceded by standing alone. Each baby's walking was marked by characteristic idiosyncrasies of gait, length of step, manner of placing the feet.<sup>10</sup>

Shirley's<sup>11</sup> sequence of stages is: (1) *passive postural control*: lifting chin and chest, "stepping movements tensing muscles for being lifted, straightening the knees, and sitting on the lap"; (2) *postural control of entire trunk and undirected activity*: "sitting alone momentarily, knee push or swim, rolling, standing well with help, and sitting alone one minute"; (3) *active efforts at locomotion*: "progress when on stomach and scooting backward"; (4) *locomotion by creeping*: "standing by furniture, creeping, walking when led, and pulling to a standing position by furniture"; (5) *postural control and coordination for walking*: standing alone and walking. Motor development of the individual child is conditional upon his "predisposition to good motor coordination, his general store of muscular energy, and his proclivity to expend it."

The alternate movements of the legs in walking are, according to Dunlap,<sup>12</sup> partly reflex and partly perceptual. Stimulation of the foot alone is not sufficient to produce a walking movement but must be accompanied by stimulation of other sense organs, as, for example, seeing the ground, or by the *idea* of walking.

If that loop in the neural pathway which passes through the cerebrum is removed, "the more direct connections through the cord and brain stem function without interference, and by stimulating the bottom of the foot in a way similar to that in which pressure on the ground affects it, the *walking reflex* can be obtained, regardless of general conditions of stimulation."

Crawling or creeping may or may not precede walking. Some babies simply get up and walk without previous creeping. If the baby has any opportunity to move about freely on the floor he usually, however, prefaces his attempts at walking erect by going on all fours. In this way the muscles of the trunk, legs, and arms are strengthened and coordinations are perfected. Watson says that if the baby be placed face downward, "contact and kinaesthetic stimuli bring out very general bodily activity" and also that circular motions result if one side of the body is more active than the other. Going on all fours is a serviceable and practicable method of transporting himself from one place to another. If the baby is going to creep he can be expected to go on hands and knees at ten months; and at eleven or twelve months, on hands and feet.

The variety of means of locomotion which can be grouped under the general head of creeping is surprising. Rolling over and over, rolling half over and then sitting up, "hitching" over the floor, pushing with one leg and dragging the other are some of the fashions of creeping. Gesell describes a baby who "propelled herself forward while lying on her back by a regressive pushing by the heels." Frequently the baby moves backward before he is able to move forward. Watson speaks of noticing a "regression of as much as four inches" very shortly after birth. It was a long time after he could walk that Preyer's son learned to "move forward on hands and knees" and "to kneel down."

A thoroughgoing and delightful study of this stage of going on all fours has been made by Hrdlička, who compares races and analyzes in great detail the development of locomotion.<sup>13</sup>

Gesell<sup>14</sup> says that "some kind of squirming, wriggling progression is all but universal at four months." At that age the baby makes some effort to raise his head or shoulders and may be able to sit with the aid of a slight support. Ability to sit alone appears at the age of six to nine months. Pushing with the feet



is "very strongly developed at the age of six months and is milder but not infrequent at four months." From nine to twelve months he stands with help, and at the age of twelve to eighteen months he stands alone. Stepping movements are "characteristic of the nine-months level." A few children walk at nine months, more at twelve, and by eighteen months practically all.



FIG. 5.—The soles of the feet are turned toward each other.

It is interesting to note that when tiny children sit alone on the floor the soles of the feet are turned toward each other. Possibility of walking depends upon what Watson has called the "extensor-thrust," which usually develops in the first few months of the child's life. Preyer called attention to the alternate bending and stretching of the legs when the infant is held upright, to the repeated "lifting and putting down" of the feet. A stiffening of the muscles of both legs comes as the weight falls on the feet. Shortly after this appears, the child when held in an upright position begins to try to pull himself up. Between

the seventh and eighth month, according to Watson, many infants pull themselves up with little help by holding on to something and briefly support themselves in a standing position.

In order to maintain stability of his upright posture the baby must have a wide base of support and the lowest possible center of gravity. Consequently he stands with his feet far apart, the toes turned out (that is, everted or pronated), his knees locked, and his head and the upper part of the trunk carried forward. Eversion or pronation of the feet prevents his falling forward, while falling backward is avoided by holding the head and trunk in advance of the center of gravity. The toddler tumbles backward more often than forward. As he begins to walk, the feet are moved forward to a new base while his body advances "*en masse* by means of a side-to-side turning movement." Increasing motor coordination makes it possible for the child to support himself on a narrower base and, with the feet acting as a fulcrum, to move forward. Although the child becomes progressively knock kneed until he is three years old, after that the condition normally disappears. The abdominal muscles by that age should be strong enough to reduce the prominent abdomen that characterizes early childhood.<sup>15</sup>

Stability of the body in erect posture depends upon three factors: "basis of support (which is the area enclosed by the two feet), the position of the center of gravity, and the weight of the body." In children, unstable equilibrium is due to the small size of the base of support, the relatively high situation of the center of gravity, and the slight weight of the body. Since coordination of the muscles which restore equilibrium is immature, the child frequently falls.<sup>16</sup> Burnside goes on to say that little children increase the base of support by placing the feet widely apart, lower the center of gravity by slightly bending hips and knee joints, and facilitate muscular coordination by raising the arms; "as the child's ease in walking increases, the arms are flexed at elbows, and only the forearms are held forward." At a still later period the arms are suspended at the sides as in adult walking.

When the little child steps, he raises his foot more than does the adult. This together with his difficulty in maintaining equilibrium gives his first walking the appearance of a trot. He

trusts his weight to the outer sides of his feet and consequently wears out the outer edges of his shoes first. His toes turn out rather than in. Steadiness of balance and length of step increase with age, while width and variability of step decrease. From eager walking, running has naturally developed by the age of eighteen months.

Burnside<sup>17</sup> summarizes the progress toward efficient walking as:

1. Crawling. With the abdomen in contact with the supporting surface, the body is pulled along by the arms which move simultaneously, while the legs drag. Gradually the arms begin to move in alternation and the legs come into use.

2. Creeping. The trunk is raised from the floor, and the body is supported on hands and knees. Cross coordination of the limbs begins.

3. Walking erect with rhythmic alternation of the legs.

The baby's development of control over his body is summarized by Gesell as follows:<sup>18</sup> "The baby acquires a rapidly growing capital of motor achievements, which lead to progressive postural control" of hips, head, back, legs. In four months the head is held erect; "in nine he sits erect; in twelve he stands erect; in eighteen he walks with a skill distinctively human. Hopping, skipping, jumping, standing on one leg, dancing, perhaps even pirouetting may all come before the school age."

The tests of motor development devised by Cunningham<sup>19</sup> list among others the following involving the use of the legs:

*12 months:*

- To walk with help.
- To stand supporting self.

*18 months:*

- To walk without help.
- To climb over an obstacle.
- To climb three steps.
- To climb upon a low box.
- To slide or back down three steps.

*24 months:*

- To get off a chair (height thirteen inches).
- To climb upon chair (height seventeen and one-half inches).

## 30 months:

- To walk up a flexible plank elevated eight inches at upper end.
- To walk upon parallel beams.
- To walk between parallel lines on floor.

## 36 months:

- To walk up steps without support.
- To walk down steps without support.
- To jump with both feet from an eight-inch elevation.

Andrus in her "Inventory of Habits,"<sup>20</sup> lists the following items:

- Go up or down steps on all fours?
- Walk steadily?
- Walk without dragging feet?
- Walk backward?
- Run unsteadily without falling?
- Run without falling, steadily but little controlled?
- Run steadily and controlled without falling?
- Run lightly?
- Run backward?
- Skip on one foot?
- Skip on two feet?
- Gallop?
- Show motor control in rhythmic response, *e.g.*, march rhythmically?
- Whirl without falling down?
- Climb on anything about three feet high such as lockers, window sills, etc.?
- Climb one or two rungs on the jungle gym?
- Climb to top of jungle gym?
- Climb down jungle gym?
- Climb rope ladder?
- Climb down rope ladder?
- Climb on blocks, steps, etc., to build?
- Do any other climbing?
- Jump up and down without falling?
- Jump down six inches without falling?
- Jump down one foot without falling?
- Jump down two feet without falling?
- Jump down three or more feet without falling?
- Go up the slide?
- Go down the slide with help?
- Go down the slide without help?
- Go down the slide holding on?
- Go down the slide without holding on?
- Go down the slide in more than one way?
- Go up the slide in more than one way?

Kick a ball?

Walk the walking beam with help?

Walk the walking beam without help?

Use the walking beam without falling off ?

The average age in months of walking and talking as given by Mead<sup>21</sup> is:

Activity	Age, months			
	Normal boys		Normal girls	
Walking	13.875	P.E. $\pm$ 0.97	13.21	P.E. $\pm$ 1.12
Talking	16.5	P.E. $\pm$ 2.75	15.5	P.E. $\pm$ 2.63

Mead defines walking as the ability "to take a step unassisted" and talking as the ability "to use a word intelligently, that is, to associate the idea with the object." Terman found that gifted children walk about a month earlier<sup>22</sup> and talk about three and one-half months earlier than Mead's normal children.

An especially interesting developmental summary is given by Hollingworth:<sup>23</sup>

- a. The gifted walk and talk earlier, and the feeble-minded later than the normal individual.
- b. Walking comes before talking, except in the case of the gifted.
- c. Variability in talking is greater than in walking, and the gifted are more advanced, the feeble-minded more backward, in talking than in walking.

Transition from walking with help to walking alone may be a slow process and is, according to Shirley, but little influenced by parent's efforts to hasten or retard it. She found that as soon as the babies were proficient in walking they lost interest in the walking test.

Any consideration of walking as an indication of development must be accompanied by realization of the fact that progress of walking may be impeded by unpleasant experiences such as falling or stumbling. Walking, obviously, is dependent upon the maintenance of equilibrium, and this is no slight accomplishment for the little child. In addition to the preservation of an

upright position, the child must at the same time accomplish the movements which produce progression. Until skill, with the accompanying assurance, is achieved progress in learning is easily impeded. The painful or frightening fall may serve to condition the child negatively and therefore to delay his accomplishment. A far more potent deterrent, however, is any suggestion of concern on the part of another person lest the child hurt himself.

An incentive or goal is often of great effect in stimulating locomotion. As soon as the child discovers that he can get for himself the things he wants, his walking improves. J. Mark Baldwin's little girl walked very well as long as she held on to something but refused to take a step unaided. One day she happened to pick up her father's cuffs, put them on her own arms, and then started bravely off. For several days she walked freely when she wore the cuffs and finally discarded even that "crutch."

"In an early stage of walking, the learner requires . . . many cues for the adequate balance and coordination involved in effective and safe locomotion: the vision of near-by objects; organic and static (vestibular) patterns of stimulation that vary with general bodily position; the tactile feel of feet on floor; the kinaesthetic patterns involved in movements of legs, arms, trunk, and eyes; and the spatial effectiveness of a great many cues." At first walking in the dark does not succeed well because visual cues are still needed.<sup>24</sup>

Successful walking, which has become completely automatic in the adult, requires close attention in the little child. If his attention lapses his walking suffers. Binet's observation regarding the effect of attention on learning to walk was based on the performance of two sisters. The older one although the weaker, who gave her whole attention to the business of walking, was more successful than the younger, who would start out with no consideration of what she was doing.

The child's facility in pulling himself up to a sitting and then a standing posture is followed by a demonstration of skill in climbing. Gesell<sup>25</sup> tests the ability of an eighteen-months child to get an object which is out of reach but which may be secured by standing on a chair. The child, at eighteen months, is expected to climb on to the chair to reach the box or basket; at

twenty-four, to move the chair from one place to another in order to get it into the right position.

If the baby has an opportunity to practice stair climbing he becomes proficient at an early age. At two he goes up- and downstairs by himself. The arms play an important part when the child is learning to walk upstairs, for he tends to pull himself up by hanging on to the railing. At first both feet are set on each step; gradually, the hold on the banister is relaxed; then only one hand is used. Then one foot only is used on each step; finally the child has mastered the business; he goes up with feet alternating freely, without holding on to the railing. The following notes on nursery school children illustrate this process of learning:

S., aged two, in going up- and downstairs, put both feet on each step and held on to the rail with both hands. Two months later, in climbing, he still needed to put both feet on each step but held the rail with only one hand in going downstairs; while his hand was on the rail, one foot only was put on each step.

F., three, went upstairs and down holding on with one hand and putting a single foot on each step. A month later she could go upstairs without holding on.

At first this climbing and descending is done very slowly, but gradually speed and freedom are acquired. Stair climbing requires the expenditure of much greater energy than walking the same distance on the level. While descending the stairs is easier than climbing, even that costs more energy exertion than walking. As with all gymnastic apparatus, use should be adjusted to the endurance and the proficiency of the performer.

**Eye-hand Coordination.**—Immediately after birth the infant is able to spread his fingers and to close his hands; a few hours after birth his hands and fingers make contact with his mouth.

Due to the extreme sensitivity of the lips to contact, the baby learns much about objects by mouthing them. His inveterate tendency to put everything in his mouth has its roots in the suckling response, since the lips seize whatever comes into contact with them, and is reinforced by the sensitivity of the mouth as a touch organ. The first object to receive this exploratory treatment is the hand. After the child has learned to seize and hold an object, that object, like the hand, is explored

by the lips. In this process not only the hand is raised but the head is lowered also. A persisting trace of this is found remaining in the child's unskilled handling of the fork or spoon when he lowers his head part way to meet the utensil, rather than lift the latter the entire distance to his mouth. So the ill-bred adult may be sometimes seen resting his forearm on the table, while his head and shoulders make the necessary movements of approach to the food.

In the beginning, grasping is a matter entirely of touch; the hands tend to seize whatever they touch. Only gradually does the eye come to play a part in this. Miss Shinn observed in her niece's behavior that, at first, the hand thus holding an object came into accidental contact with the mouth. Slowly the infant acquires skill in inserting an object so seized into the mouth. These contact sensations are gradually associated with visual as the eye chances to light on the object.<sup>26</sup> Preyer noticed that his son opened his mouth before or immediately after an object was grasped, and Koffka generalizes: "grasping after something seen is for a long time the first stage of an undertaking to bring a seen-object to the mouth." The perfection of the eye-hand coordination, that is, the ability to reach out and grasp an object which the child sees, occurs according to Watson from the one hundred twentieth to the one hundred thirtieth day of life. "Once the reaching coordination has been formed, infants respond positively to nearly all small objects which are given a high stimulating value by moving them."<sup>27</sup>

**Use of the Hands.**—In the very young child hands and feet move simultaneously. When the baby is unhampered by clothing he expresses his feeling of well-being by such movements of arms and legs. The response to stimulation is diffuse and involves all four limbs. Inhibition of movement, coupled with response by one member, is developed but slowly. Whatever stimulus initiates movement of one hand tends to initiate corresponding movements of the other hand. Even after simple or practiced movements are easily performed with one hand, an unusual or difficult movement involves both, as in the movement of the thumb when the fingers are doubled over into a closed fist at the age of two and a half and successive opposition of fingers and thumb at three and a half. If asked to close his hand



and move his thumb, he finds it easier to respond with both hands than with one. So also in the opposition of thumb and fingers, response with both hands occurs more often than with one alone. This simultaneity of hand movements is shown in adult behavior when gestures emphasize or express emotional excitement.

The thumb of the tiny baby lies across the palm, and not until he is three months old does the thumb assume the adult position, paralleling the fingers. Grasping at first involves all the fingers, since the fingers move as a unit and are used together in a hooklike manner. It is not until the child reaches the age of four or four and half that he can handle fork or spoon in the adult manner; the younger child grasps the handle by doubling all four digits around it. Grasping it in the fashion of holding a pencil requires a far greater degree of dexterity. From old Scandinavian tales it appears that the childish method of grasping was common among the ruder groups and that what is now regarded as the adult method was by them considered something of an affectation of elegance, since it was practiced by those of the upper levels of society.

The little child's ability to carry things, to handle "spillables" safely, is astonishing to anyone unfamiliar with the rapid growth of skill. The child proceeds from the necessity of holding his glass in both hands through facility in shifting the position of his hands on the glass while drinking to skill in managing his glass with a single hand. From being obliged to carry his plate with both hands he proceeds to use one hand only and then to pride in carrying a breakable object in each hand. Even when these acts are performed easily and skillfully he may continue to spill food from his fork, since the skill of correct aiming is added to ease of balancing one object upon another. The excellent balance achieved by a child of twenty-three months who sets a long block on end and beside it a ninepin is spoken of by Harriet Johnson.<sup>28</sup>

Cunningham<sup>29</sup> lists the following tests involving the use of arms and hands:

*12 Months:*

- To remove paper cap from head.
- To tap small bell.

To remove hoop from knees.

To take hoop off neck.

18 *Months*:

To roll a bowling ball eight feet.

24 *Months*:

To roll a rubber ball halfway up an incline.

36 *Months*:

To throw a soft ball into a basket.

In her inventory of habits Andrus<sup>30</sup> gives a long list of movements involving the use of the hands. A few of these are:

Bounce a small ball so it bounds back nearly straight?

Bounce a large ball so it bounds back nearly straight?

Catch a ball?

Bounce and catch a ball?

Throw or roll a ball seven feet or more?

Throw or roll a ball to a definite object?

Throw a ball or other object into the air?

Clap or tap to music?

Get up from floor using two hands for support?

Get up from floor using one hand for support?

Get up from floor without any support?

Development of motor coordination is of great importance in the acquisition of those skills which in later life become almost altogether automatic, such as control of the sphincters, washing, dressing, feeding oneself. All these, as well as others, are necessary if the individual is to conform to those conventions which have arisen as a means of making living together in groups an easier thing for all concerned.

### THE DRESSING PROCESS<sup>31</sup>

A moment's thought will reveal both the complexity and the importance of the dressing process. Since taking things off is easier than putting them on, skill in undressing is acquired earlier than the ability to put on clothing. An even greater degree of motor coordination is needed for the manipulation of buttons and buttonholes.

It is probably true that interest in an activity and ability to carry on that activity are apt to occur together. Any mother will testify, however, that a child's interest in dressing himself is fitful and that

often time is so short in the morning that the child is hustled or cannot be allowed to complete the operation, since his skill is as yet inadequate. Because he dallies, the half-finished job is taken out of his unskilled hands. Frequently "stalling for time" is successful on the child's part because the adult does not know whether the child actually can or cannot perform a given operation. "I can't lace my shoes" may mean actual inability or "I don't want to" or "I want you to do it for me"—three very different things.

An activity attempted too soon, that is, before sufficient development has been reached, may be hindered in arriving at its full perfection because of loss of interest or negative attitudes developed through discouragement. On the other hand, if it waits too long the zest is gone and lack of interest may prevent the development of skill. To solve the problem of how and when to teach a child to dress himself quickly and adequately would be a boon to parents and would help to preserve the child's enthusiasm for mastering new tasks. The Montessori dressing frames, devised to teach the child how to manipulate fastenings, have been criticized on the ground that the situation is an artificial one and therefore offers a less appropriate teaching opportunity than the child's own clothing.

Binet set up one test situation involving a dressing process—tying a bowknot—which he placed in year seven. Skill in knot tying, which appears later than ability to do the lacing itself, is involved in the fastening of shoes that lace.

Most of the studies of motor control in young children, that is, with those under five years of age, deal with gross muscular coordinations, involving the use of trunk and limbs. Those which concern themselves with the hand and arm have to do with grasping, releasing, reaching, aiming and are but little concerned with movements of the separate fingers.

Any study of motor control involved in the manipulation of garments or of fastenings must needs be paralleled by efforts to devise a type of garment that will itself be most easily manipulated by the child, for much of the difficulty of dressing lies in the garment itself. Attempts to solve this phase of the general problem are underway at various nursery schools and at institutes for child welfare. The perfect garment will lend itself to manipulation; in other words, it can be drawn on or off easily and will have the fewest possible and the simplest fastenings.

In the process of dressing, the hands play the chief rôle. Yet the importance of the visual-motor adjustment is indicated by the children's remarks. When asked to fasten a button in the

middle of the back they are apt to say, "It's too hard, I can't see it." Children who can fasten an ordinary snap with ease when they can look at it are quite unable to fasten the same sort at the neck of dress or blouse. Occasionally a three year old has learned to do it when looking into the mirror.

In manipulating fastenings the eye guides the hand, so that only when a high degree of skill has been attained are the hands able to manipulate successfully without the guidance of the eye. In successful unfastening, chance plays a large part. Jerking, pulling, more or less aimless fumbling may separate button and buttonhole. Buttoning involves a fitting together, the insertion of one object within another, which depends upon perception of spatial relationships. The young child finds pleasure in fitting together such things as pans with snug covers, nests of blocks, or insets. In this way he practices movements and perceptions of relative size and position.

Young babies frequently amuse themselves by pulling off their clothes. Dressing, however, presents a great variability of difficulty, because changes in weather and the child's constant growth prevent the situation's remaining constant. A coat may slip on easily over a dress but not over the extra sweater. Rubbers that have been easy to manage present a difficult task when the old shoes are discarded for new. Consequently it requires constant watchfulness on the part of the adult if he is to judge correctly that help is needed.

### BODILY SKILLS IN THE NURSERY SCHOOL

An enumeration of the bodily skills involved in the daily routine of the nursery school would throw into relief the achievement of the two-year-old child in contrast with the helplessness of the newborn. Before a child is eligible for admission to a nursery school he must have sufficient control to maintain an upright posture. This alone is not sufficient, for he must be able not only to maintain himself in static erectness, he must also be able to use his legs and feet in getting himself about from place to place. Walking, running, jumping, kicking, stamping, all these as well as the ability to shift his body from one place to another are necessary for a free participation in nursery school activities.

His arms and hands he will use in the manipulation of the equipment. In pulling, pushing, and in dressing himself, his hands and arms are in constant activity. In dressing himself, in fastening his clothes, in unfastening and pulling off his wraps, lacing and unlacing shoes he uses as much energy and as much skill, that is, speaking roughly, as he will need later on when he comes to write and play the piano.



FIG. 6.—Daily routine of the nursery school throws into relief the achievements of the two and the three year old.

The child's skillful use of his body is a tool by means of which he manages his environment. It must be remembered also that physical manipulation of the environment is accompanied by social manipulation. In other words, a little child while attaining bodily skills is at the same time mastering the techniques which make possible the management of himself as one of a group. Manipulation of other human beings is a skill more easily acquired and one more native to the child's capacity than adults like to think.

Before the child comes to the nursery school he must have achieved considerable control over the sphincters and the muscles which control voluntary elimination.

Another skill which is necessary is that he shall have learned to feed himself, to drink from a cup, to carry "spillables" without too much loss on the way.

The final group of skills is the one summed up in the word "talking." While communication is largely a matter of gesture, posture of the body, and tones of the voice, before a child is ready to profit most by the nursery school he must be able to use language. This use of language is a double function—the receiving of information through words and the giving of information by the same means.

The complexity of motor coordination involved in talking is further increased by the additional movements of gesture and posture. There are people whose speech apparently would be less fluent if their hands were tied so that they could not gesticulate. Part of these excess movements is due, in the little child at any rate, to a diffusion of energy so that other than the essential motor pathways are innervated. In some adults gesticulation varies directly in amount with fatigue or nervous excitement. The use of bodily movements as an accompaniment of speech arises out of this drainage of diffused innervation. In addition, movements serve as cues by which the auditor may judge vehemence and enthusiasm of the speaker. Whether or not such movements are a direct aid in the mastery of speech could be determined only through careful records which would allow comparison between speech development and spontaneous movements.

### USE OF OUTDOOR EQUIPMENT

Nursery school playground equipment comprises both stationary and movable pieces. Through the use of these pieces of apparatus the child extends his radius of activity, he alters the planes of activity, and experiences new spatial relationships as well as develops motor skills. It is largely upon such changes that the child's vigorous use of materials depends for its continuation.

The child of three feet or less in height exists in a different world. The temperature, for example, around his head is apt to be several degrees colder than the temperature around the head of the adult. We realize the need of covering when lying

down but have attributed that need to retarded circulation of blood and have failed to realize the actual decrease in temperature at the diminished height.

Comprehension of the limited range of vision helps one to understand the enthusiasm of children for getting up higher.

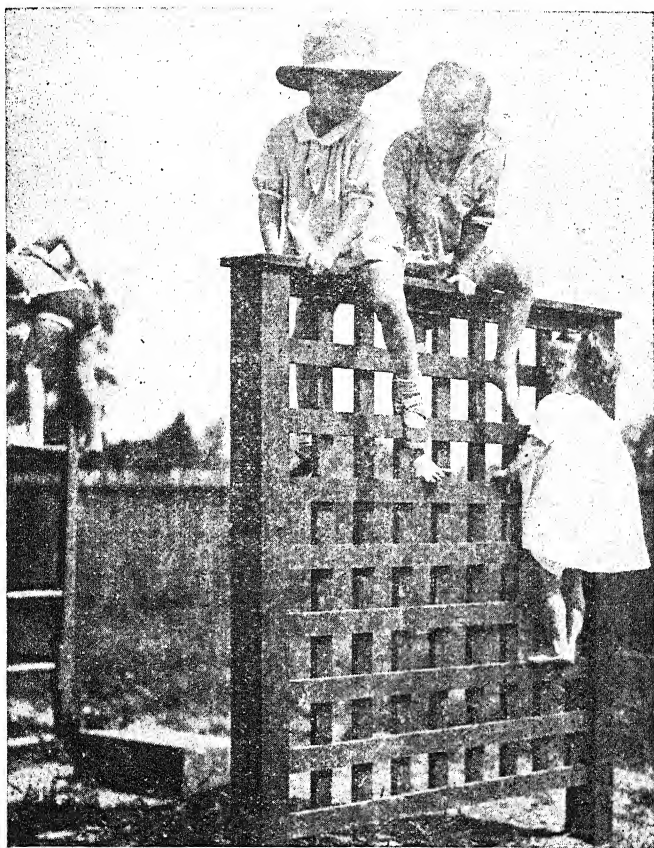


FIG. 7.—Climbing, by increasing the child's height, gives him a feeling of power.

Workmen were preparing a golf course on the hill beyond the nursery school. Some of the smaller children kept asking to be held up so they could see what was going on. It was not until the teacher stooped down until her eyes were on the level

with the child's that she realized that the two year old actually could see nothing of what everybody was talking about.

Climbing, whether it be on furniture, trees, fences, or jungle gym, by increasing the child's height, that is, the distance of his eyes from the ground, tremendously extends the activity. Both angle and range of vision are altered. So any bit of apparatus that extends the height is apt to be popular.

The delight in going up and down steps has its source in the changed relationship due to changes in body position. The field of vision becomes a new one. This extended outlook—the alteration of the body position in relation to the ground—gives rise to a feeling of power which in itself is pleasurable. The enriched sensory experience is not to be ignored. In addition, the child enjoys testing his capacities.

For the smaller child, walking boards, which range from the simple two by four laid on the ground to the complicated series of "duck walks," are the sources of enriched sensory experience and of a feeling of power over his world which is always a source of pleasure. Any narrow surface such as the top of a bulkhead or a railroad rail is always a challenge to the child, a suggestion that he should try out his capacity for maintaining his equilibrium.

Another unfailing source of amusement is the descent from a higher to a lower level. The little child prepares with elaborate care to step off a box raised six inches from the ground. A little later he prepares with just as much care to jump from that height. At first his jump is just an exaggerated stepping with one foot and then the other. After a little practice at this he learns to lift both feet simultaneously and, as it were, to step with both feet at once. Then finally he succeeds in bending his knees and swinging from the higher level to the lower.

Another source of popularity is found in the release of fear. The thrill that comes as a result of successful use of the slide on the part of the child who has been timid is one of the high experiences in a child's life. The difficulty of the little child in getting up the flight of steps, coupled with his unskillfulness in managing to swing his leg over the top step and then the height of his body from the ground—height, that is, in proportion to his body length—all contribute to making the slide a difficult and therefore delightful piece of equipment. Then the speed of move-



ment, the sudden change in body position, and the safe landing on the ground give an understandable zest to the experience. This swift sliding is as near flying as most children come.

Other inclined planes serve somewhat the same purpose, but they may be used in differing ways. If the incline is shorter or more gradual, the ease with which it is negotiated is increased. There may be a plane wide enough for wagons or sleds or wheelbarrows to be taken up and down. When the fun of going down the slide or other inclined plane becomes a bit tame, the pleasure may always be increased through a new fashion of going down, such as lying down instead of sitting, head first, or on one's stomach.

It is not in order to discuss here the use of or the growth in power over each separate piece of equipment. It is, however, important to call attention to the fact that movable playground equipment provides a rich source of sensory and motor experience. Not only is it interesting to the little child to shift his own body positions, he finds it amusing to shift the position of objects. Not only does this give him information about spatial relationships, it yields in addition the pleasure of demonstrating his power over materials. Things to push and pull—wheelbarrows, wagons, huge balls—provide almost limitless opportunities for both these experiences. Things which he may carry about in building—blocks, planks, ladders—are another source of satisfaction in being a moving cause.

Swings do give the child an opportunity to shift his position and, as he learns to swing himself, bring into play combinations of muscles which are otherwise but little exercised, yet they seem to be a less important addition to the playground because they permit a more limited range of activity on the part of the child.

It may not be true that good posture results inevitably from adequate exercise, but it stands to reason that a body which is given an opportunity for full and free use of its muscles will be able to maintain a more perfect equilibrium and a more effective posture than the body which has not learned to use itself skillfully.

While all children show a tendency to be knock-kneed and turn their feet out in order to secure a wider basis for support, yet, as muscular control increases, the maintenance of equilibrium

becomes more perfect so that the child does not need to aid himself by a bodily position which is less economical. Since no one yet knows exactly how much of this "baby knock" is permissible and how long this may persist, and since no one knows at what stage of development the child should walk with parallel feet, all that we can do is to give the child opportunities for free use of his body which will encourage the straightening of legs and feet while at the same time strengthening the muscles of trunk and arms and legs.

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## CHAPTER VIII

### LEARNING TO RESPOND TO OTHER PEOPLE

In a world peopled by human beings, response to other people is inescapable. The human elements of a child's environment are more potent as sources of stimulation than the non-human. Since response to stimulus is the law of living material, that receiving mechanism—the child—is also a reacting mechanism.

#### RESPONSES TO OBJECTS AND TO PEOPLE

The helplessness of the little child, his dependence upon the adult for bodily needs, lay the child peculiarly open to stimuli derived from contact with people, but in the beginning the baby's response to a person is not differentiated from his response to an object. What differences there may be in the infant's perceptions we have no way of knowing, nor do we understand when the distinction between person and object is first made by the child.

A study of the feeding reactions of a young baby made by Ripin<sup>1</sup> discovered that although the bottle was recognized at the fourth month, "specific reactions to persons occur earlier than to the bottle." The conclusion is drawn that "the giver of nourishment takes precedence over the object of nourishment itself."

Even though the baby's reactions give evidence of this distinction between person and thing, it is a long time before the dissimilarity is distinguished completely. People are treated as objects, and objects as people. What is sometimes called cruelty in a little child—biting, striking, pulling wings off insects, and so on—is actually not cruelty at all but the application of similar treatment to objects and to living things.

Recognition of a difference between objects and persons comes by way of the variety of stimuli received from each and through responses made by each. Contrast between the passivity of the inanimate object and the reaction of a person helps to lay the basis for distinction in the child's mind.

The person moves in and out of the child's field of vision. Objects also come and go, but persons change as well as move.<sup>2</sup> These changes and movements attract the infant's attention, especially when they occur simultaneously with the child's own activity. The person supplies the child's needs. The physical comfort which results is related to the person, so that the child, whenever he is uncomfortable, learns to demand the appearance of the familiar person. To the physical comfort is added the emotional experience of satisfaction and well-being. There is evidence to show that this latter is as essential for the child's development as the former.

The responses made by the person to the child's activity increase the likelihood that the infant will repeat the spontaneous movements which have aroused the adult's reaction. Thereby the child learns to associate his activity with the adult response. The child cries and is fed, he coos and is answered with signs of appreciation. In this way conditioned responses are set up so that the child makes to the bringer of satisfactions the same indications of well-being and pleasure that the bodily comforts originally called forth.

At first whatever consciousness the child may have of people consists of isolated sensory experiences. Sensations of contact, pressure, odor, sight, and sound are aroused. Through repetition these isolated, but simultaneous, experiences become integrated into a cluster, and that cluster of impressions remains sufficiently uniform to be recognized as an entity. For a time the parts of the total experience must be constant if recognition is to occur. Absence or change of an essential element may prevent recognition.

These sensory impressions are intermittent; the mother moves about the room, in and out of the child's field of vision; the sound of her step and the rustle of her dress are heard and then are silent; as she cares for the child she touches him now here and now there. The little baby has no notion that he may expect a recurrence of these sensory experiences. Through the return of these experiences he builds up an impression of a permanent individuality. To this impression of a persisting whole he soon adds expectation of return. Further experience leads him to demand a repetition of that cluster of sensory experiences.

Persons offer a wider variety of stimulative experiences,<sup>3</sup> visual, auditory, tactual, than do inanimate objects and are interesting objects to the child rather than fellow social beings.<sup>4</sup> Very early in life the baby appears to take comfort in people. Crying stops when some one enters the room. Perhaps vibrations set up by footfalls serve to produce this cessation of response. Footfalls, of course, are characteristic of persons rather than of objects, but a sort of pathetic fallacy may intervene.

#### DEVELOPMENT OF RESPONSE TO PERSONS

Bühler describes the child as "positively directed toward other human beings." She finds that the first social approach occurs in the second month when the child's glance "allows itself to be enticed by the glance of the grown-ups." Negative reactions to people do not occur until the second year. This result of Bühler's studies would explain that rather sudden onset of shyness or timidity in the presence of adults so often mentioned by parents. Not until a child is five months old does he perceive another child. By the age of nine months he "calls to the other child, offers him playthings, and cries bitterly if the grown-up gives his attention to another child." Organized play activities were observed in the eleven-months child.<sup>5</sup>

As was stated in the discussion of development of recognition of a cluster of sensory experiences that occur simultaneously, a marked change in this sensory group destroys recognition. When baby sees his mother with her hat on, he cries instead of shouting his welcome. Mother concludes that baby thinks her hat unbecoming and says, "He doesn't like my hat." As a matter of fact, the hat itself in all probability has no significance for the baby. The significant fact is that mother-wearing-a-hat is a different thing from the well-known mother-without-a-hat. That this experience is by no means confined to infancy is clear from the frequency of such remarks as "I didn't know you without your hat."

Recognition of persisting individuality may occur in the original setting but may be impossible in a new situation. The cluster of sensations includes those received from the setting as well as those from the person. A nursery school teacher went to see a two year old in his home. When he was brought into the

room he began to cry and to turn away even though he had been told on the way downstairs who it was that had come to visit him. Never having seen her in his home, he could not "place" her and responded as he would to a stranger. When the same child came to the school one Saturday morning, he did not recognize another teacher who, contrary to custom, was wearing no smock.

Long after the little child has learned perfectly to recognize a total experience, he is completely unable to recognize parts of that experience; for him the experience is a new one even though for the adult there is recognition of that experience.

Consciousness of other people involves not only the integration of separate experiences and recognition of such integrated groups, but it also involves, or is followed by, effort on the child's part to arouse responses in others. Obviously this is not deliberate in the sense that it is thought out by the child. By trial and error the child learns that certain movements on his part arouse movements in others. His cries bring both the satisfiers and the satisfaction of his wants. He in turn reacts to the stimuli presented by other people—when patted he shows his pleasure, when frowned upon he is repelled. A further step in the developing consciousness of other people is taken when a form of communication is set up. The most rudimentary form is that of gestures. As speech is developed, this consciousness becomes extended to include not only movement and emotion but ideas as well.

The little child is absorbing impressions. His time and attention are devoted to the gathering of experiences, and he has not yet learned how to respond. In older children who are less active and appear, or at least are called, less social, the same phenomenon occurs. E.'s mother was greatly distressed because he "stood around." She felt that he should use the apparatus and that he ought to show interest in the other children and attempt to play with them. What she failed to see was that E. was so busy taking in impressions that he had neither time nor energy for overt expression. That had to wait until he had absorbed the experiences offered by the environment.

A two year old often stands near an adult or another child, making no direct effort, no apparent attempt to secure a response

but expressing by his attitude an interest in the other person. This may have its root in the comfort, the warmth, both literal and figurative, so obtained. "Nestling" is a common response on the part of young creatures. There is a pleasantness in simply being near a familiar person which shows itself in a desire for company.

Another early social response is the expectation of relief or of aid. Since the little child's need is met by aid almost as quickly as he feels it, he shortly looks to the adult for help.

Because the little child's responses to other people are different in kind from those of older children and adults, the little child has been described as non-social. Yet any mother has learned that even a young baby possesses some appreciation of the presence of other people. Many a baby has stopped whimpering when an adult has gone into his bedroom even though no direct approach was made to him.

Social behavior involves two parties: child and child or child and adult. Impressions received from other human beings, the ingathering of experiences rather than interaction, occupy the little child's attention. Yet if there is to come to pass any development of learning in the realm of responses to other people, interaction must occur. It is obvious that in the life of even the young baby some interaction takes place. Very early in his life the hungry baby learns to appeal to the source of satisfaction, Very early he learns to read the cues which indicate whether or not a strange adult is of a friendly sort, whether the unfamiliar adult is *sympathique* or not. Little children are adepts at muscle reading and respond accordingly. Their uncanny judgment as to the trustworthiness of a newcomer is proverbial.

Observation of the behavior toward one another of a group of children such as may be found in a nursery school leads to the conclusion that the extreme individualization of the little child is apparent rather than actual. His means of social expression are more limited. Being inexpert in the use of his body and of materials he may interfere with others, colliding with another child, insisting that he have something which is already being used. Pushing, shoving, hitting, snatching are not necessarily misbehavior but rather indications of inexpertness. The relationship between increasing bodily expertness and group activities



deserves notice. Furthermore the child's means of communication are not sufficiently perfect to permit a free interchange.

Gradually children learn to adapt their behavior and their thinking to the needs and wishes of others; that is, they become socialized. It may be that in reality this contrast of individualization and socialization is spurious, that the little child in his relations to other people should not be measured by adult criteria. Such a consideration might help to clear up certain attitudes on the part of mature people.

### THE CHILD'S CONTEMPORARIES

Much of his individualization is due to his isolation from contemporaries. Three months' difference in age is not so great

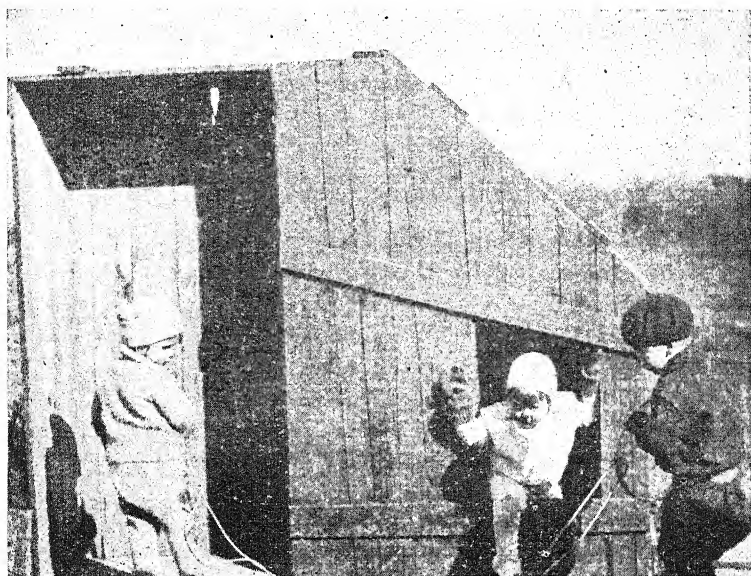


FIG. 8.—Although the young child appears to be working alone, it does make a difference whether other children are within sight and sound.

for the three year old, but what a vast difference in maturation and experience lies between the newborn and the three-months child.

Although the young child apparently is working quite alone, oblivious to other people, the careful observer is impressed with

the indications his behavior gives of his consciousness of contemporaries. Even though, at first sight, each may seem to follow his own occupation independently, his attitude indicates that it makes all the difference in the world to him whether or not other children are within sight or sound. This companionship in proximity offers a very definite sort of satisfaction.

Friendliness waits upon opportunity to show itself. Association with contemporaries, with those very close to himself in age, offers the young child an opportunity to give more and more complete expression to his interest in other people, until gradually after much practice he arrives at the stage of doing things with other people, that is, collaboration.

Spontaneous group formations do occur. Frequently the group comes into existence because several children are using similar materials. In this case the grouping may be apparent rather than actual, since it is the apparatus that brings the children together rather than an interest in each other or a sharing of activity.

Even in such grouping by contiguity a change soon comes due to the perception of the other children. Children at the seashore may apparently be absorbed each in his own digging, yet there are subtle and unmistakable changes in their behavior when other children are within sight and sound. Then, too, even in such random groupings interference comes, due to inexpert use of body or tools. There appears also a sort of mutual suggestion—one wants to do what he sees another doing and consequently modifies his activity. A more developed stage is due to chance or accidental contacts which stimulate joint activity. Finally come deliberate combinations made up of the seekers and those sought out. Here there must be sharing in the use of common property and the taking of turns. Collaboration, doing things together, is the highest stage of social development.

Strong likes and dislikes which mark their relationships with each other develop freely and are as freely expressed. If the child is to master legitimate forms of expression, if he is to learn that these attitudes may be modified by further acquaintance and that liking may grow into affection, he must have opportunity for experimenting with people.

M. refuses to allow J. to join the group playing house, saying "No, we don't want you." A little later M. says to J., who has taken a toy from the table, "Yes, you may play with it, but don't let S."

B. had excluded from the group those she did not particularly want.

When R., trying to join this group, stood near them, she picked up his toy elephant, carried it to the other end of the room, and said, "Here, R., is your elephant. You can play better here."

The importance of contemporaries in maintaining the satisfactions of life and in adequate social relationships is generally recognized with relation to elderly people. With reference to the social development of children the function of a group of one's peers has not been adequately recognized. Russell<sup>6</sup> emphasizes the importance of this factor in the child's development and says that children feel that other children are more nearly akin to them than are adults.

The truth of this is borne out by the readiness with which one child can comfort another. In a street car one child gives immediate solace to another whom he has never before seen. The crying child's response to an adult would be one of antagonism or, at best, indifference. He yields immediately, however, to the child who offers consolation or even interest.

Confidence in contemporaries shows itself very early in life and leads to results sometimes in accord with adult convention and knowledge, sometimes at variance with them. H., a three year old, disliking green beans with an active dislike, was, of course, given a very small portion. They were cut so fine that their identity was somewhat disguised. Still, she suspected them and announced that she did not want to eat any beans. Then B., aged two, said, "They're not beans, they're peas." She took a mouthful but again protested, whereupon B. replied, "Eat them; they're good." After another mouthful, she was still doubtful, but B. said earnestly, "Why, I don't taste a single bean." Slowly and savoring carefully each mouthful, she did eat them. Not being quite convinced of the correctness of his judgment, she none the less was completely swayed by his opinion so confidently expressed.

Children are so nearly on a level—physically, mentally, socially—that they readily understand one another. The child's

imperfect speech is little bar to comprehension. Another child easily interprets this inadequate speech for the benefit of an adult.

Even a little baby shows enthusiasm when his slightly older brother or sister enters the room. The interest which very little children manifest in one another is not due merely to the attention value of another human being. There is something involved other than the fact that the child moves and is alive. His movements and his alertness are far more significant than those of any grown person.

This interest in one another forms the basis for social relationships. As time goes on, habitual attitudes and characteristic forms of social behavior are developed. The child who lacks the advantages due to fortunate personality traits needs all the more abundant opportunity to experiment and through experience to master the technique of successful relations with other human beings.

There were two children in the nursery school, J. and S., who were more or less solitary, being ignored or even avoided by the other children. It so happened that in rather close succession two new children were enrolled. One of these was the sister of another child who had been in the school for some time and who exhibited the newcomer with great pride as "my sister." When the second newcomer, A., arrived both J. and S. claimed her as sister. S. followed her around, never allowing her to get out of sight. When J. said "she's my sister," S. replied with feeling, "No, she's my sister." Then another girl, M., who was an only child, interposed, "No J., you have one sister, I'm your sister; A. can be S.'s sister." All during A's second day in the school S. continued to call her his sister; the third day he asked "Where is my sister?" and went over to sit beside her.

This episode gave a good deal of insight into S.'s behavior, which had been very much withdrawn and even antagonistic. It seemed as though he had broken through his diffidence and his inexpertness in being friendly, in the presence of this stranger who was even less skillful than he.

Managing other people appears very early. C., aged three, warns E. who is a year older than she, "Don't drop the plate." To H. she says, "Stop making that noise. If you do that again

I'm going to tell your mother." To D. she says, "You sit here, and I'll sit there."

Care for others involves appreciation of possible consequences. F. and H., who were carrying a board, were about to drop it. "Don't hurt yourself," said F., who was four. Perception of the needs and wishes of others shows itself in such remarks as "I want to get your dinner" or "You got spoon?" when dessert is served. A two year old pointed to the place of another two year old at table, saying, "Has no chair." The same child said, "M. H. has no g'ass," and again, "Her have some meat too?"

They have the greatest facility in teaching one another, and, conversely, they learn from one another with the greatest ease. Witness the readiness with which they pick up phrases and tricks of behavior. The alacrity with which one child learns from another is partly due to the closer attention he pays to the child teacher and, wherever bodily activity is involved, to the greater similarity in proportion and consequent radius of movement. It is very difficult, almost impossible, for an adult to teach a child to hippity-hop. The adult is able to give the child the idea of how skipping on one foot is done but to teach him the process by which skipping on alternate feet takes place is another matter. Yet one child can teach another with ease. Skipping, of course, is an act requiring a high degree of motor skill and usually is not learned by children younger than four.

The relative weight of a child's praise or blame is greater than an adult's. Disapproval expressed by a child is much more potent in bringing about a change in conduct. Whatever the other children approve is regarded with favor in spite of adult disfavor. All these aspects of group relationships have long been recognized in children of school age and over; their presence and significance in the life of the young child have not sufficiently received attention, however.

If the child has no opportunity to establish relationships with his contemporaries, he may learn to associate freely with adults and may lose to a greater or less degree his spontaneous reactions to other children. E., for example, had grown up in a household of adults who were all devoted to him. When he came to the nursery school he sought his social relationships with adults and was quite unable to establish any freedom of

association with children. So, also, S. came to the school from a circle of worshipping relatives but fortunately remained in the school long enough to establish a technique for child responses. Autobiographical accounts of John Ruskin, John Stuart Mill, and others reveal the deprivations which result from lack of child companionship and also indicate that even if adult companionship is substituted, adequate equivalent in learning is not provided.

In the days of large families, companionship of contemporaries was pretty well provided for. That parents recognize the need for some provision of such relationships is indicated by the frequency with which "need of companionship," "no play-mates at home," and similar reasons are given in explanation of the wish to send a child to a nursery school. The mother who informed the nursery school staff that she was sending her child to the school "for society" and demanded that the staff see to it that her child got it may have been a little confused in her thinking but she had some perception of the value of contemporaries in the child's life.

### CHILDREN'S FRIENDSHIPS

The immediacy with which little children form attachments for one another and the strength of those friendships further reveal the kinship they feel for one another. B. and D., for example, were about the same age when they entered the nursery school. Before they had learned one another's names, each referred to the other as "my friend": "Has my friend come yet?" or "My friend is out of doors." They much preferred playing with one another and spoke of one another during the week end. The occasional absence from school of one or the other brought about a wholesome relationship with other children and prevented too exclusive an interest in one another. This friendship was neither superficial nor transitory. Several months after these boys had left the nursery school D. said to his mother one morning, "I had the loveliest dream last night; I dreamed I was back in the nursery school playing with B."

Sometimes these friendships shift quickly. A given child seems absorbed for a brief while in one after another of the

children in the group. From one after another he gathers the companionships that meet his particular need.

Hero worship, whole-hearted devotion to a slightly older child, plays an important part in the life of the little child. Because of the value of give and take there are advantages for both older and younger child in an opportunity for association, if ample space safeguard the leisure of each. Approval frequently is sought from those recognized as leaders: "I can go (swing) high, can't I?" "Look what I did"—such remarks are not boastful statements but requests for recognition or approval.

The traits of friendliness that make for popularity and good fellowship and for devotion in later years show themselves very early in the little child's behavior. Interest in other children varies from absorption in one's own affairs to complete dependence upon the society of one's contemporaries. Attempts to direct other children's play, willingness to accept direction, readiness to collaborate are obvious on the nursery school play ground.

Mutual suggestion is an active force, for each wishes to do what the other is doing and modifies his behavior accordingly. Leaders must have followers, and followers need leaders. The sharing of common property, taking turns, are learned only through practice.

Although there is an immediacy of mutual comprehension and of concern for each other in little children, the child is by no means oblivious of adults with whom he has no especial acquaintance or established attitude of affection. The questions asked a workman are one form of social response. D. frequently looks up at an adult and says "What's your name?" "Where you going?" Such curiosity is about the behavior of adults themselves rather than interest in their doings. It appears to be the ditch digging rather than the ditch digger that in many cases interests the child.

### COMMUNICATION

The importance and prevalence of *talking* as a means of establishing relationships with other people have frequently been mentioned. Among themselves, as well as in relation to adults children find their most frequent form of social contact in talking.<sup>7</sup>

Merely to inform an adult that wrong has been done him seems to bring the child relief. He must share in words his experience, pleasant or unpleasant.

Egocentric speech influences the child's behavior in another way. The words of another are frequently repeated and apparently are adopted as his own. These phrases may definitely influence his behavior. E. repeats the remark S. has made, "Get in the choo-choo." Although he had shown no interest in the suggested activity, his repetition of the words appears to bring about performance of the act, for he climbs into the box.

### GROWTH OF EXPERTNESS IN SOCIAL RELATIONSHIP

Response to other people presupposes at least some control over the self. Development of bodily control in the young child is paralleled by increasing control over other people. Development of response too depends upon the increasing mastery of the means of communication. The child must make his wants known and must communicate his ideas. The paucity and character of Helen Keller's responses to people and their enrichment and changed character due to Miss Sullivan's teaching her a means of communication illustrate this point.

Any adequate development of response to other people rests upon the child's mastery of his own emotional behavior. The emotional responses of the young baby soon cease to be adequate. The result of their persistence is the "spoiled" child.

Control over other people is at first egocentric—the baby demands satisfaction of his physical wants. This demand is reinforced by cries and screams. Gradually, however, he comes to want more than physical comfort; approval, indications of interest, recognition of his individuality are demanded.

Much of the social control first developed by infants is the direct outcome of their helplessness. Unfortunately adults are apt to ignore the gradual disappearance of the inability to manage their own affairs and in consequence permit a primitive sort of social control to persist.

Adequate response to other people is dependent, furthermore, upon the development of effective personality traits. The hold that the affectionate child has over adults in contrast to the indifferent one is a case in point. It is the exceptional adult who



lacks appreciation for the good taste shown by the child who elects to sit in his lap. Everyone likes the cuddly child and without thinking reacts negatively to the child who clearly indicates his indifference. Timidity shuts the child out of many human relationships and excludes many possibilities of social control. Too much arrogance (too great independence) antagonizes others, while deference (dependence) is appealing.

Development of adequate responses to other people depends, in a large measure, also upon perception by the child of the effect of his emotional responses and upon his interpretation of the emotions of others. J. said, "He wouldn't give it to me but I cried and then he gave it to me."

Through the development of concepts of social behavior, by the accumulation of ideas regarding what responses are to be expected from other people, the little child learns something about his power over other people. While realization of his power over other people is not always present, trial and error with chance success serve to teach him much regarding the extent of the social forces he exerts. Gradually he builds up habitual attitudes which insure a continuity of effort regardless of the sensory impressions of the moment.

An attitude of submission to other people or of assertion of power over them becomes so thoroughly established as to be characteristic of the personality. Submission is often a sure way of gaining one's end and is also an excellent method for securing the approval of others. Anticipation of reward or punishment may bring out an attitude of submissiveness.

Children, like adults, vary in their sensitivity to the impact of personalities. Some children protect themselves from too free a response to other people by a withdrawing or aloofness. Other children who are less sensitive to this impact are consequently able to meet people more readily, to respond to them more pleasantly, to behave in a more friendly manner.

The touch-me-not attitude may actually be due to cutaneous sensitivity. The children who object to having the chance acquaintance fondle them, who dislike being touched, are apt to be the children who mind rough clothes, are uncomfortable when wearing certain textures. Whether or not this has any connection with allergy may be a question.

A child who has been subjected to painful medical treatment, who has been held perhaps while certain necessary but unpleasant medical care has been given, may show this negative reaction to the demand for response. Treatment for an infected ear, a closed tear duct, the removal of a birthmark, or the removal of tonsils or adenoids may require a fairly long convalescence which is both physical and psychological.

A child who objects to being handled may be of a temperament which does not shift quickly and which needs plenty of time to make an adaptation. Adults expect an immediate and positive response and are seldom careful to consider whether or not the child responds slowly, nor do adults make their approaches gently.

The adult who has made advances is seldom able to understand why a child should withdraw from his proffered caresses or should fail to respond to him. He may be hurt or grieved and in turn may show this by withdrawing his interest or his apparent affection. He may, on the other hand, attempt to buy the desired response. The harmful effect of either method is obvious, and the complications are evident when the adults are relatives or the close friends of the family.

The aggressive child is apt to take the initiative in relations with other people. Occasionally a child who is non-aggressive, even timid, as far as his own affairs are concerned may be aggressive for other people. E.'s parents were disturbed because he was not combative enough to defend his own rights. Yet E., who would not resist an attempt on the part of another child to seize his plaything, would spontaneously go to the rescue of some one else. When X. snatched a shovel from M., a two-year-old girl, E. quietly and without a word took the shovel away from X. and handed it back to M.

Although, as was stated at the beginning of the chapter, responses to other people are inescapable, the types of responses which became habitual are the result of practice. In this field, as well as in others, the law is that the fewer the number of habits formed at the same time the more quickly each habit is established. Increased knowledge as to what types of social response appear first and what succeed would affect our methods of teaching. The production of one type of behavior may

interfere with the development of others in learning to respond to other people, just as happens in other fields of learning.

A pertinent suggestion is made by Anderson<sup>8</sup> with regard to the opportunity for practice in social responses. Those responses which come easily are more highly practiced. The "born leader," he suggests, may be less "born" than highly practiced. Chance success of a response leads to its repetition. In the same way through chance success an undesirable response may become an integral part of behavior. Chance failure of a desirable response may lead to its elimination; desirable responses which have no opportunity to be practiced tend to die out.

William James's injunction regarding the desirability of forming new habits should be observed with reference to the learning of responses to other people. The business of learning how to respond to other people is a continuing process, admitting of modification in undesirable or in desirable ways. Although types of response are established at an early age and tend to persist, they are subject to constant alteration due to their success or failure in subsequent situations.

Responses to other people are built up into a series. The "good manners" expected of a two year old are simpler than the good manners expected at five. The habit systems of response to other people develop into attitudes which in turn control the response made in new situations. Self-control is not expected in the little baby's response to other people. As the child matures, an increasing degree of restraint is expected to appear. That this capacity for restraint and for direction of social responses comes through the counteraction of undesirable response and the encouragement of desired ones is not always recognized.

Learning to respond with people is as important as learning to respond to them. Collaboration, teamwork, a readiness to accommodate one's self to other people are essential. It is easier for any individual to respond *with*, that is, cooperate with, some people than with others. When B. and D. play together, each readily adopts the suggestion or criticism of the other. D. may even take a block out of B's hand; but if S. comes up and takes the block out of B's hand, trouble results. S. being only two has not yet learned how to play acceptably and is regarded as interfering. Or F., who is larger and more vigorous, may take

the block in such a way as to arouse B's rage, precipitating a struggle for possession.

"You, go away from here, we don't want you" or "I don't like him" may express a feeling of antagonism or may be merely a verbal statement of the inability of either one to collaborate with the other. Capacity for managing other people and for getting along with them undoubtedly springs from an attitude of interest in other people and from a feeling of well-being but is also affected by learning.

Children care a great deal about being included in the group. There is no surer means of discipline than exclusion from the group, and consequently care must be exercised in its use. This desire to be an acceptable and accepted member of the group increases with age and with growing appreciation of the power of the group until it reaches its height at adolescence. Stern<sup>9</sup> says that a "feeling of intimacy with individuals is simpler than group relationship." The truth of this statement emphasizes the function of learning in the development of complicated types of response to other people.

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## CHAPTER IX

### MASTERY OF THE EMOTIONS

The smiling, eager aliveness of the healthy baby, the flushed, puckered noisiness of the baby who has been denied something which he wants are almost automatically translated by the observer into adult terms. We say the baby is happy or is angry because we know that if we behaved in that particular way we should call ourselves happy or angry. Adults interpret children's behavior and characterize it in terms of their own experience. This limitation of adult understanding is further complicated by the fact that so much of the behavior of adults is actually on the same emotional level as the child's. The directness and spontaneity which are characteristic of the child make for that immediacy of response to stimuli which leads to explosive behavior. From the very beginning of the child's life, however, his emotional behavior is modified by experience. The emotional behavior of any individual is so quickly overlaid by learning that differences in behavior are to be attributed to training and experience as well as to inborn tendencies.

Although learning so greatly modifies early emotional responses, it must be remembered that there are basic physiological differences which are significant factors throughout life in determining emotional attitudes. The difficulty of evaluating these differences impedes the training of emotional behavior. Reaction time, for example, and what June Downey has called "load" and "inflexibility" are but little, if at all, modified by experience.

#### EARLY EMOTIONAL RESPONSES

Whenever an individual is confronted suddenly with a situation which demands a quick adaptation or an unforeseen readjustment, a stirred-up state of the organism results. Observation of very young children has discovered facial expressions and muscular reactions which can be interpreted as emotional response. These, according to Watson's laboratory study, are

named fear, rage, and love. What Watson has called "fear" has been experimentally aroused by sudden loud sounds or sudden loss of support. Köhler has suggested that it is the suddenness of the stimulus, rather than its quality, which is adequate to arouse a response. "Rage" was aroused by holding the baby's head or its body. Anyone who has attempted to help a baby maintain a given position, such as that made necessary for measuring it or for medical treatment, knows the violence of reaction which bears every evidence of anger. Love, according to Watson, is aroused by stroking and patting.

The emotional behavior of young children has been described by Mrs. Bridges<sup>1</sup> as "diffused," that is, as a state of excitement, either distress or delight. Excitement gradually "becomes differentiated and associated with certain situations and certain motor responses."

H. E. Jones and M. C. Jones remind us that Watson's theory of three basic emotions, with their stimuli, was derived from studies of very young babies. "With older children it is possible that the list would need to be supplemented both as to the stimuli which by *original nature* may provoke emotion and as to the pattern which the emotion takes." Changes in emotional pattern may be due not only to learning but to some extent also to a "process of ripening, either of a general responsiveness or of special response dispositions."<sup>2</sup>

The adult's emotional life is characterized by no such limited range of response as is the baby's. The primary emotions are blended in varying proportions to form sentiments or secondary emotions; both primary and secondary emotions, through learning, are attached also to a wide range of stimuli. This process begins in infancy and continues as long as the individual lives.

Childhood's emotional behavior is characterized by its immediacy and by its strength. S., aged four, was asked why she was playing in the schoolroom instead of getting ready for her nap. Immediately she flew into a rage, screamed, stamped her foot, and cried out that she was putting things in order. A woman annoyed by what she regarded as an unnecessary question would have pushed her broom more vehemently or shaken her dust cloth with more than her customary vigor, perhaps accompanied this by an angry retort.

## THE LEVEL OF ACTIVITY

The child who flies into a temper is urged to control himself. To set up a standard of self-control in itself emphasizes the difference in emotional behavior tolerated in the child and in the adult. The very fact that immediate, violent emotional responses are described as childish or weak emphasizes the function of learning in the emotional life. In the process of acquiring socially acceptable forms of emotional expression the "activity level" functions. That there is for each individual a characteristic activity level is indicated by such expressions as "working at a low ebb," "going strong." This level of activity is the characteristically adult mode of emotional response.<sup>3</sup> The high-powered child gives vehement expression to his emotions. This explosive behavior gradually assumes less specific outlets. The available energy is diffused through more varied channels and over a longer period of time. Cannon calls attention to the function of emotion in mobilizing the energy of the organism for increased activity. If, however, "this energy is not released in overt activity it will result in tension of the skeletal muscles."<sup>4</sup>

Jones<sup>5</sup> noted an inverse relationship between the psychogalvanic response and the amount of overt activity in infants and children under four. A child whose response to a moderate startle stimulus is to jump "is less likely to show signs of autonomic activity than if he repressed the outward response." "A reaction series which terminates in crying (in a young infant) frequently shows a reduction of autonomic activity, as measured by the galvanometer, at the time when crying begins." Thus it appears "that an outwardly 'integrated' type of behavior may be accompanied by a greater degree of inner disturbance than behavior which involves a frank and direct emotional release." The results of Crane's study of deferred emotional disturbance as a result of shock are in point here.<sup>6</sup>

Sudden, strong stimuli may for an appreciable length of time appear to be ignored. Then comes intense, even exaggerated response. J. accidentally pushed over a screen, which fell with a loud noise and shattered a bottle. This was greeted by silence, then there burst forth from the other children shouts and excited laughter which continued intermittently for a matter of minutes.

As the adults in so far as was humanly possible ignored these shouts, they finally subsided, but J., even when resting on his cot, twitched and grimaced.

A newcomer in the nursery school may be too quiet, too well behaved, refusing to join in the activities, preferring to observe rather than to participate. This same child may become exceedingly active at home; his mother complains that since entering nursery school his behavior has been ruined, for he climbs over the furniture, shouts in the house, races about. As familiarity with the nursery school and adjustment to it increase this heightened response at home diminishes. The "naughtiness" of the child who has been visiting or who has been a member of a shopping expedition may be explained in the same way.

### THE AIM IN DEVELOPMENT OF THE EMOTIONS

Like a jack-in-the-box the child's emotional outbursts pop up in a disconcerting fashion. To push the lid down may settle affairs temporarily; but a discipline that crushes the exuberance of expression may tend to destroy the vividness of the emotional response.

The goal of emotional training is the development of a rich and deep emotional life which finds expression in ways that are acceptable both to the individual and to the group. The methods of training used all too frequently imply that this goal is one of elimination or confinement. Unfortunately both of these methods come easily to hand and are apt to be used unthinkingly in training just because of their immediate effectiveness in settling matters for the moment.

To smother emotion may transform it into a harmful thing. To eliminate emotion is to restrict the vigor and efficiency of the individual and to limit his enjoyment of life. From the standpoint of mastery of the emotions, either is bad. The desirable thing is to preserve both strength and variety of emotional response. To do this some understanding of the methods by which such learning takes place is essential.

### METHODS IN MASTERY OF THE EMOTIONS

Emotion serves as a powerful reinforcement for behavior. Dashiell finds emotional reactions to be less significant on their



own account than because of their powerful influence either positive or negative upon overt activity. Emotion may increase or decrease the level of activity; states of depression, grief, or disappointment may easily diminish the energy or retard the accomplishment of any activity. The stages of organization of native energy into definite lines of activity are:<sup>7</sup> (1) The external stimulus becomes increasingly important in arousing activity; (2) substitute stimuli become potent; (3) words become effective as substitute stimuli. Through experience, relatively permanent systems of emotional response are built up around given situations or objects. Through trial and error, emotional reactions are attached to stimuli that chance to "excite them and thereafter tend to have the right of way when those stimuli reappear."

**Trial and Error.**—Not only does trial and error play an important part in building up habitual emotional attitudes, but it is also an important method in the mastery of the emotions. A three year old was walking along an inclined plank. To her surprise she fell off, then, picking herself up, she laughed. If she had fallen far enough or had struck something that hurt her she would have cried, being frightened, and probably would by chance have laid the foundation of a fear response. It so happened that in a situation which ordinarily would have called forth a cry she accidentally hit upon joy. In the random movement of hand and arm a baby gets his thumb into his mouth; because the experience is pleasurable it is repeated. Whatever emotional response happens to be successful is the one that is apt to be repeated. In this way temper tantrums are built up, and so may stoical attitudes toward pain develop. Some quite casual factor which accompanies a situation may by chance assume significance. In this way emotion becomes a disturbing factor through connection with reactions other than the one to be learned.<sup>8</sup>

**Conditioned Responses.**—Recent studies of the conditioning and reconditioning of emotional responses have thrown great light upon the way in which situations acquire power to call forth emotional responses and have emphasized the importance of learning in the development of the emotional life. Objects and events, casual accompaniments, through association acquire power to set off the emotional response.<sup>9</sup> Such insignificant

accessories come to have great importance in determining emotional behavior.

One day R., a cricket-like young person of two, dashing about with her dinner plate a little recklessly, lost hold of it. The crash which resulted surprised and frightened her so that she refused to attempt to pick it up. When gently asked to do so, she frowned but made no move to do as told. Although her behavior gave a general impression of deliberate refusal to the point of obstinacy, there was a theoretical basis for assuming that she was too frightened to risk repeating the disastrous performance. Consequently her hands were pulled gently down to the floor and clasped about the unbroken edge of the plate. A slight urging brought the desired response, and gleefully she carried the plate back to the serving table. As she was in the process of learning to carry breakable things, there was every chance that an early failure and fright might have negatively conditioned her so that this simple procedure of the nursery school dining room would have been learned with very great difficulty.

Fear of dogs may come because at the moment the child attempted to pet the dog he barked. When it was necessary to give three-year-old H. a Schick test, he screamed in terror at the first prick of the needle. The previous summer he had been severely stung by bees; as a result he had a terror of any pricking sensation as well as of winged insects.

**Negative Adaptation.**—Raising the threshold of stimulation occurs in the realm of the emotions as well as in the field of motor response. When H. first experienced the doctor's morning inspection he decidedly disliked having the tongue depressor used and refused to open his mouth when he saw the applicator in her hand. Daily experience gradually wore down his fear so that he not only willingly allowed its use but apparently enjoyed the process of inspection.

M. wanted very much to go down the slide, but each time she climbed to the top of the steps her fear got the better of her. Finally having grown accustomed to climbing to that height she allowed herself to slide. Immediately she repeated the performance with less indication of fear, and gradually after many trials her fear completely disappeared. So J. stood on a plank raised a few inches from the ground, trembling, making incipient

jumping movements, but drawing back. Finally she leaped the few inches safely and after several repetitions showed no more indications of fear.

Through negative adaptation a child overcomes his fear of the dark. Through a gradual decrease of the amount of artificial light he learns not to fear the darkness.

J.'s first experiences of stairs came when she entered the nursery school at the age of two. Being plump and round, she had difficulty in managing them and was in addition rather clumsy. For some days she showed a good deal of fear when stair climbing was necessary. At first she was allowed to hold a teacher's hand; then she was taught how to steady herself by resting her hand on the railing. Gradually she realized that stairs were meaningless and harmless as far as she was concerned, and her fear disappeared. Unfortunately, when she had reached this stage she slipped and fell down several steps. For days after that the signs of fear reappeared but disappeared more quickly than during the first period of learning. An interesting indication of her fear was her tendency, whenever she thought herself unobserved, to get down on all fours and climb "baby fashion" even though she climbed easily in an erect posture.

The nursery school is built on sandy soil which blows rather badly on windy days. When J. first came she would come in crying on such a day, saying, "I'm afraid of the wind." Each time she was assured that the wind could not hurt her, and before long she played happily on windy days with no signs of fear.

**Heightened Response.**—In the development of emotional learning, heightened reaction plays an important part. The repetition of a series of movements which call forth a given emotion increases that emotion. B. and D. were riding their tricycles around a circle, shouting when they reached a particular spot. Each time around they shouted with greater joy.

Several children were seated at a table, using various materials. J., who was playing with wooden cubes, began to hum. Then others joined in softly. She hummed louder; the others followed her example and the tone of the humming mounted higher and higher until J. finally burst forth into a yell and threw the blocks on the floor, one by one as hard as she could. Whereupon the other children also began throwing their materials. By means

of the gradually increased humming the children so excited themselves that violent action resulted. There the matter ended, for when the throwing was stopped they settled down and played quietly with other things.

A., who was greatly annoyed because B. interfered with his play, hit B. vigorously. Thereupon B. returned the attack with equal vigor. The more they hit at one another the angrier they grew, until each was told to sit quietly on a box.

H. S. cried when his mother left him at the school, begging her to give him another kiss. Each day this grew worse; more and more kisses were demanded.

S. tormented J. by hitting her. At first she started to cry and to object mildly. She had climbed to the top of the slide, but when she saw him begin to climb up after her she looked wildly around for help and began to scream.

S. cried piteously because she did not want her mother to leave her. From past experience she knew that in the afternoon her mother would come for her, but still she cried. When told quietly to stop crying she said "I can't, I haven't got my hanky." When given a handkerchief she wiped her eyes and stopped crying. The use of a handkerchief by an adult to wipe her eyes had been accompanied in times past by a comforting voice and presence. Consequently the handkerchief had acquired a capacity for soothing her sobs. What are called temper tantrums may result from a piling up of stimulation.

**Emotions as Serial Responses.**—In the field of the emotions, serial responses are built up. What are sometimes called habitual attitudes are, in part at least, serial emotional responses. Such emotional attitudes are attached to given situations. An individual's entire behavior in one situation may be characterized by quite different attitudes from those which appear in another. Tarkington in his accounts of adolescent behavior has made humorous and penetrating use of this fact. William at home and William away from home follow quite different emotional sequences.

After the same fashion a nursery school child's emotional behavior may follow one sequence at school and another at home. A child, who at school is inclined to cry easily and to be rather sad, at home is full of happiness and gayety. Another child

shifts from an affectionate, docile attitude in school to an irascible one at home.

Another type of serial response in the realm of the emotions may be called a mood. When the children awoke from their nap, the wind was blowing, there was thunder, and rain fell in torrents. J. was very calm as she dressed herself, speaking to no one except to ask to have her dress fastened. While she was washing her face she looked out of the window and saw that it was raining. Then she began to cry softly, saying "My mamma can't come for me if it rains." As she drank her milk she said while tears ran down her cheeks, "It is raining and I am not crying; it is raining and I am not crying."

#### ELIMINATION OF UNDESIRED RESPONSES

Oftentimes in a nursery school a cry of rage is simply ignored. The child soon learns to omit this response of rage, which originally appeared when he was given a simple command such as "It is time to put your things away" or "Go, wash now."

Crying often elicits expressions of disapproval on the part of the other children. Frequently the disapproval is expressed in terms of self-commendation, "I don't cry, do I? I'm a big boy." Such disapproval, either expressed or tacit, tends to eliminate an emotional response.

L. was annoyed at having to feed herself, so she cried, apparently expecting to win her point by this method. She was sent from the table with an invitation to return when she stopped crying. During her first dinner hour at the nursery school this was repeated a dozen times; the next day, but once or twice; then ceased altogether.

#### ALTERATION OF EMOTIONAL ATTITUDES

The description of the child's behavior in adult terms may be inaccurate, but as yet we have developed no more accurate vocabulary. When a child shows that it perceives a difference in the total situation after the birth of another baby he is described as being jealous of the baby. To the surprise of parents, this occurs when every effort has been made to prepare the child for the new baby. When F's mother returned from the hospital with H., F. apparently was interested in the new baby but

puzzled her mother by demanding help which before the baby's birth she had never thought of wanting. She was an independent, happy, resourceful child, of unusual perception. Consequently her mother was disturbed by her refusal to go to bed by herself, by her irritability.

No amount of discussion about the baby to come nor interest in the future relationship could prepare a three year old for the changes that actually occurred. In the first place, another individual was to be included in the family circle; this additional member of the family was an exceedingly important person, who required and received a great deal of attention.

E.'s mother also was troubled because he, "having been told all about the baby's coming," failed to accept her as readily and comfortably as the parents had expected him to do. The parents overlooked the fact that there were now four instead of three in the family and that the social situation was thereby altered.

What is called jealousy in such cases may be merely the evidence of a severe demand on the child's capacity for learning. Emotional attitudes that had been well established cannot in a moment give way without signs of strain, nor are they replaced by the new and necessary ones without a process of learning.

In both these cases the mothers solved the problem by recognizing the older child's need for time in which to acquire an understanding and an affection, to build up new emotional attitudes. By deliberately including the older child as a helper in the bathing and dressing of the baby, by giving the older child the intimate consideration which he missed, perhaps by a slightly more obvious expression of affection, this difficult learning was aided. It is almost impossible for an adult to appreciate the problem set for a young child by this situation. No wonder if he fails to learn without practice, no wonder if his failure to master the task shows itself in resentment of the intruder.

The case of J. is another illustration of the problem in alteration of emotional attitudes set before the child by situations in themselves both necessary and highly desirable. She was one of those rosy, plump, curly-headed youngsters who for many adults are irresistible. By their admiration and enjoyment she had by the time she was two been led to the mastery of an

almost perfect technique of enchantment. When she was three, her charm still held satisfactorily enough so that she had not needed to alter it to keep pace with her increasing size. By this time her brother was arriving at the "cute" stage.

At this point her mother asked advice as to how she could cure J. of noisy, obstreperous behavior; J. forced herself, she said, upon people's attention so that she was becoming obnoxious. What really was happening was that J., realizing that her efforts failed to produce their accustomed result, used the only method she knew; that is, she redoubled them. As a result her exaggerated methods became not effective but obnoxious. Yet she was pursuing the course she had learned through three years' practice. Naturally squelching was no remedy but merely aggravated the situation. What the child needed was a respectful appreciation of her three-year-old powers and charm, which were not at all the same as the two-year sort.

#### TRAINING OF THE EMOTIONS

Emotion involves energy which in some way must be expended or drained off. This drainage of energy may occur in wholesome or constructive fashion or through means which are undesirable and disintegrating. It is possible to learn how to use this activity, that is, to learn how to transform this energy into a means for obtaining desirable ends. It is possible also to learn when to use activity for the accomplishment of desirable and legitimate ends.

The importance of early home life in the development of emotional attitudes and the modification of personality traits has been stressed in recent years. Perhaps too little attention has been given to the function of the home in building up desirable emotional attitudes. It is certain that in the home, habitual emotional attitude is of the greatest importance for the comfort of each member. What we call happiness is a by-product of emotional stability which is yet not solidified into a lethargic response to the stimuli of everyday life. Spontaneous enjoyment of little things is a source of happiness which is not to be despised. Finding satisfaction in everyday comforts and pleasures without being dulled to the privileges offered by unusual experience is perhaps the surest safeguard of mental health.

It is fortunate that the energy of response which we call emotion can be drained off into response other than the usual one. Laughter, for example, may provide a substitute outlet. A child about to cry because he has fallen down may learn to laugh instead. Sometimes, through the so-called laughter of ridicule, various stirred-up states are relieved.

Mastery of the emotions may come through raising the threshold for undesirable stimuli and lowering that for desirable ones. This is an aspect of learning which may well be emphasized. Everyone has experienced that increased sensitivity due to illness, anxiety, fatigue which permits him to respond to slight, unimportant or irrelevant stimuli. In other and more fortunate moods these same stimuli have lost their power to call forth response. To some extent the emotional control which lies in acquiring a capacity for ignoring such stimuli may be a matter of habitual attitude.

The increased fearfulness of familiar noises when one is alone in a house at night is known to everyone. These same noises are either ignored or, if noticed, have no disturbing quality when other people are near. Even a favorite animal may induce an attitude of indifference, a feeling of safety. This "primitive feeling of comfort through companionship"<sup>10</sup> banishes fear largely by decreasing the attention given to certain stimuli, by increasing indifference to these meaningless sensory impressions.

It is possible also to change the affective tone by altering the motor set. Marston<sup>11</sup> describes his own success in eliminating the unpleasantness of toothache by changing his motor set from one of resistance to one of complete acceptance. When the resistant motor set was resumed, the unpleasantness returned.

That spontaneous dislike of persons which probably is due to a conditioning factor may be lessened by a deliberate effort to discover appealing aspects of the individual. To take care of a little child is to become fond of that child.

### ELIMINATION OF FEARS

The fear response is not fixed or constant but changes with the development of the individual.<sup>12</sup> Because fear of people or things or ideas plays so large a part in determining behavior and



in inhibiting the enjoyment of everyday living, elimination of fear has come to occupy a very large place in mastery of emotion.

No amount of discussion of the disadvantages of fear is necessarily efficacious in removing fear. Jones found that negative adaptation was an effective method for eliminating fear. Parents have used this time-honored method in teaching the child to stroke the dog which has frightened him or to feed the dog. The example of other children is another means for relieving fear. No child likes to be bound by fear when other children are enjoying a given situation. However, according to Watson, the introduction of social factors tends to breed negative reactions both to the object and to the group. The process of unconditioning which involves the frequent application of stimulus may fail in that summation occurs rather than elimination. In other words, intensification of the fear may result rather than readjustment. Many an adult has attempted to destroy a little child's fear of water by forcefully carrying the child into the sea, only to realize that instead of producing an indifference the child's fear is exaggerated by the new experience. "Fear arises when we know enough to recognize the potential danger in a stimulus but have not advanced to the point of a complete comprehension and control of a changing situation."<sup>13</sup>

The most satisfactory methods for eliminating fear are direct conditioning and social imitation. The former by associating a "craving-object" with the fear stimulus replaces fear by a positive response. The latter is effective by virtue of prestige. Verbal appeal, disuse, negative adaptation, repression, and distraction were occasionally effective but could not be relied upon except as they reinforced other methods. Summation of effect is more apt to occur when such methods are used than is negative adaptation.<sup>14</sup>

Immediate and vehement expression characterizes the anger of little children. A study of anger outbreaks<sup>15</sup> of thirteen nursery school children observed in groups of three found the greater number during the first thirty minutes indoors and during the second thirty minutes out of doors. The most frequent causes were (1) another child's vigorous attack; (2) another child's withholding a desired object; (3) calling names; (4) being thwarted by the environment. There was relatively more resistant

behavior indoors than out and relatively more retaliative behavior outdoors than in. Both indoors and out, control of outbreaks came as a result of (1) force of competition; (2) being ignored; (3) intervention by observer; (4) realization of failure of method employed.

While increasing experience enlarges our capacity for understanding, it also increases the possibility of emotional responses. Since intelligence seems to have but little effectiveness as a means of preventing emotional outbursts, protection against being swayed by the emotions lies in building up stability through physical vigor and through habitual attitudes which will guard against the development of overwhelming or undesirable emotional responses.

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## CHAPTER X

### LAUGHTER

The laughter of little children is one of the pleasantest things that ever happens. That bubbling, infectious expression of good spirits and satisfaction with living is one of the rewards of living and working with little children. Just as a mother recognizes the tone of her child's crying, so she knows immediately whether it is her child who is finding so satisfactory a means of expression.

Laughter for sheer joy of movement is a sign of health in the little child. As he runs for the sake of running, his laughter bubbles over like a musical accompaniment, in and of itself—a pleasure both to him and to the listener. Such spontaneous, uninhibited motor play comes when there is no feeling of strain, when the individual is without consciousness of himself or of other people. This sparkling sound is a delight to adults because it relieves tension and obliterates unpleasant consciousness of others.

Just as in running and jumping, energy is drained off in free movement, so energy finds an outlet through the vocal muscles in spontaneous, undirected activity. The releasing of energy which comes when strain or tension is relaxed shows itself not only in the laughter of the little child who is entertaining himself by running about, in the shouting of the boy at play, but also in the shrieks and yells of the picnic party.

Reflex smiles appear as early as the first week. Miss Shinn reports that when her niece was two months old smiles "began to be frequent and jolly" and were always called forth in response to grimaces. Mrs. Fenton's child in his sixth week smiled when she sang to him and in his seventh week when he was allowed to kick about unhampered by clothes. Darwin's child smiled at the age of forty-five days, and "a second when forty-six days old; these were true smiles, indicative of pleasure, for their eyes brightened and their eyelids slightly closed."

Jones<sup>1</sup> elicited smiles by bending over the child, smiling and making a clucking sound. If this failed to bring forth a smile, the mother took the experimenter's place. The youngest child to smile was thirty-nine days of age. All children ninety days of age or older responded with a smile.

Toward the end of the child's first year his smiles and laughter can be differentiated from a younger child's. Then developmental differences are more important than individual differences in character or type. There are, however, great individual differences in the frequency with which children smile or laugh.<sup>2</sup> Smiling in young infants is wide mouthed and is associated with kicking and arm waving. Children who laugh readily cry easily also; they are "multi-expressive." Other children smile but seldom laugh, whine but cry infrequently. Others cry less often than they smile or laugh; while others laugh but little and cry a good deal. Washburn found in her study a remarkably consistent type of expressiveness.

The first laugh naturally is an event of importance and is reported as occurring at various ages. Mrs. Fenton's child laughed first in the seventh week but not again until the twelfth; Darwin records a laugh at one hundred ten days, and Preyer at one hundred sixteen. Thus silent expression is supplemented before long by laughter. The pleasing sensations aroused seem to amuse the baby until he hilariously repeats his laughter for its own sake. In the sixth month the game of peekaboo is a fertile source of fun.

The baby's smile, which at first is a reflex, becomes conditioned so that it expresses contentment and pleasure. The rewards for smiling are by no means slight, and the effect on the adult of even a random smile is altogether disproportionate. No wonder the baby so quickly learns to use a smile as a tool. Throughout life, smiling continues to be a conditioned response to persons.

Although in the beginning the baby smile is only a grimace of pain, this smile is the first rung of the ladder of humor and wit. Through experience it becomes a vehicle for the expression of the emotions.

Laughter spreads by contagion. It is a social force, this invitation to share a delightful mood.<sup>3</sup> An expectant attitude, anticipation of sharing the enjoyment, pave the way for laughter.

A holiday mood predisposes to laughter and lays one open to the perception of fun even in the commonplace. "The interval of relief, in which laughter arises, is closely connected with play and is apt" to appear in connection with a "hilarious or holiday mood. Since laughter is always a momentary holiday, a relaxation, it is appropriate to the mental mood that reaches its height in the spirit of carnival."<sup>4</sup> "Laughter at its best" has lost touch with its motive and is, according to Max Beerbohm, "a thing to be rated according to its own intensity."<sup>5</sup>

Laughter among children accompanies good health and a pleasurable state of mind and body. It is the overflow of exuberance and fullness of life. Just as that especial exaggerated sort of breathing called crying expresses discomfort or dissatisfaction, so spontaneous laughter is an expression of a comfortable state of mind and body. This expression of delight, this jolly laughter, this overflow of good spirits is not directed at anyone or anything. Gregory<sup>6</sup> distinguishes between the sympathetic laughter of humor and pure amusement at the comic.

As Spencer suggests, when one is in a pleasurable state of mind, even a slight event may be sufficient to cause an escape of nervous energy in the form of laughter. During childhood, physical well-being and all those factors which contribute to physical well-being are basic elements in the laughable. Gradually, through learning, laughter becomes an expression of the emotions and finally a social thing.<sup>7</sup>

The sudden appearance of a beloved object such as a toy or a doll or even food is enough to provoke laughter, and an even more frequent cause of this laughter is the sudden appearance of a well-loved person. Here it seems to be the surprise, with the resulting happiness associated with the person or plaything appearing suddenly, that is able to arouse laughter. Whatever is unusual or unexpected is a source of laughter. The countryman laughs at the urban person, and the latter finds in the countryman an unailing source of fun.

Little children are provoked to laughter by noises, grotesque faces and figures, dramatic situations such as suddenly falling down, bumping into one another, sudden shifts in positions of objects or persons. The element of surprise is of great significance in arousing the child's laughter. On the other hand,

Greig<sup>8</sup> thinks that it is interruption of behavior rather than surprise which serves to call forth laughter.

The four year old who has long since passed through the babbling state is amused by absurd groups of nonsense syllables and may grow hilarious over his own verbal plays or those of another. This may underlie the delight children take in calling names or in using expletives. Familiarity with such strong expressions dulls the ear to their onomatopoetic quality.



FIG. 9.—Laughter frequently accompanies achievement.

Jokes are early appreciated by the child, but they must be childlike jokes. Here as in the age at which laughter appears there are differences due to personality. Children learn through practice to make and to appreciate jokes. Those who grow up in a household of humor are more apt at laughter and at perception of fun, but temperament sets limits for that learning. Laughter is too valuable a trait to make it wise to ignore the

fact that here also learning plays an important part in that the child is led through experience to play practical jokes on his elders or to appreciate the fun of verbal jokes. The difficulty lies in the fact that a joke for one person or in one situation may for another person or in another situation lack the particular element which completes its jocularity. Browning's lines about the "time and the place and the loved one all together" might be used to symbolize this necessity for completeness. If any essential is lacking, there is no joke. Greig expresses this idea: "It is only people with the same social heritage who laugh easily at the same jokes."<sup>9</sup>

In a study of the laughter of little children it was found that frequently the source of laughter was achievement—"the chuckle of pleasure followed the completion of some piece of work."<sup>10</sup> The social or personal element was of similar significance in children two to five years of age; laughter was most frequent during play with other children and came but seldom when they were with adults or alone.

Another study<sup>11</sup> indicated that the presence of other children is a primary factor in the occurrence of laughter in little children. Although the presence of other children does not necessarily mean an increase of laughter, children laugh but seldom when they are alone. As long as J. played for the most part alone, she laughed but seldom. When, about three months after she entered the school, she was admitted to the group she began to laugh. Age alone seems insufficient to account for this abrupt increase in laughter. Laughter seems to have value as an indication of social awareness or responsiveness.<sup>12</sup>

It must always be remembered that for the most part the funny sayings of children are neither intentional nor an expression of humor on the child's part. The humor lies in the adult's interpretation, which attributes mature significance to a simpler and more direct statement or sees possibilities of additional meaning. P. when being tested for strength of grip said, "I can't squeeze any harder; if I do, I'll break my teeth." The same child when sitting at a table much too low for her said, "What do you do with your knees?" Absurd juxtaposition of contrasted notions, the frank reference to ideas which are socially taboo, or double meanings which in the child's more limited vocabulary

have only a single connotation may arouse shouts of laughter in the adult. A boy whose mother had remarried after divorcing his father tried to explain the family status by saying, "We are living with another man now." It was not the remark but its connotation provided by adult experience which amused the grown-up. A three year old who had been having ultra-violet light treatments brought home from Sunday school a picture of the infant Jesus upon whom rays of light were falling from above. "Oh, look, Mother," said he, "the baby Jesus is having his sun bath."

Even after children have mastered the mechanism of talking, the intricacies of vocabulary continue to trip them up. They often are worsted by unfamiliar words or by the limitations of conventional meaning. The unpracticed ear may not grasp a word exactly, and consequently the tongue produces surprising combinations of sound. Alice Meynell quotes the note of a little girl who reproaches her mother for taking pride in an article. "Such an unletterary article. I cannot call it letterature. I hope you will not write any more such unconventionan trash."

The negro's inexpert use of high-sounding words is proverbial, as in the ancient joke regarding the lover who called his beloved's neck "yaller blasted" when he tried to repeat the word alabaster.

With greater mastery of vocabulary appears a voluntary confusion of words which, to the originator at least, is indescribably funny. Extravagance in vocabulary, which makes use of an elaborate or large word for a small idea, or other use of words out of place is an unfailing source of fun. Even among adults these are perennially amusing. The boy who called a sand spit an expectoration aroused a gale of laughter among his contemporaries.

The child is quick to take his cue and develops a facility in making remarks that will be greeted with appreciation. In this way is the confirmed punster developed—that is, by a process of positive adaptation. Verbal associations become almost automatic until there is hardly a chance that the punster will be able to resist.

Not only is it true that the child learns the trick of making remarks which will be rewarded by laughter and appreciation,



but he also learns to inhibit the spontaneous expression of ideas if his seriously intended remarks are treated as humorous.

New powers over one's own body or over other people call forth laughter. Dearborn's daughter on her five hundred eighty-third day was amused at her newly discovered ability to wriggle her toes voluntarily. A boy of two and a half said to a three year old, "Hello, Aggee, Aggee." When the latter resented being called this, there was much laughter on the part of the two year old.

H. is entertained at unusual situations such as, by chance, putting his rubbers in his locker with one toe pointing out and one pointing in. J. at three was amused because she had put slippers in her bag so that they seemed to be lost because no one happened to think of looking there. E., three and a half, when told that he had dropped his handkerchief looked in his pocket. When he saw it on the floor he grinned broadly. A two year old laughed when he saw two older boys who were pulling a wagon pretend to fall down as the result of their great effort. M., who was pushing the swing away from her trying to catch it as it swung back toward her, missed it, whereupon she laughed. E., who was feeling very well one day, stepped on another child's roller skate to get one of his belongings from the top of his locker. The coaster rolled away almost making him lose his balance. Not only did he laugh himself but he called the other children's attention to his mishap, expecting them to laugh also. Probably if he had been tired or cross or hungry he would have been irritated by the inconvenience and narrow escape rather than amused at the thought of almost falling over.

D. imitates the gestures of other people in an exaggerated way to produce a ridiculous effect, whereupon the other children of three and four roar. E., playing circus, says he is a funny clown doing tricks; he puffs out his cheeks and makes faces, thereby amusing others and himself most of all. Sudden changes in position seem an unfailing source of fun for the child. Although the humor of the situation may not appeal to the adult, the child laughs when some one sits down on the floor, when the expected chair fails to materialize. He laughs when the bag bursts and all the vegetables fall on the street. The adult's knowledge, through personal experience, of the consequences of such unpleas-

ant occurrence may have built up in him a sympathy which the child can learn only at the cost of his own mishaps or through verbal teaching.

Three-year-old J. amused herself by emptying the dirt from the porch boxes on to the porch. This she found exhilaratingly ludicrous. One element was that provided by the risk, since she knew that this was not a lawful occupation.

Humorous ideas are regarded as funny by quite young children. N. shows her appreciation of the impossible, for she goes up to one child after another, saying, "I'm a bear" and then laughing. D., who was almost four, was convulsed with laughter. When asked why he was laughing so uproariously, he said, "We said we were fish and we ate fish."

Children repeat endlessly the same joke or a humorous verse or a series of nonsense sounds, deriving great enjoyment therefrom long after the adult is bored.

The range of things which cause laughter is extended by experience. The polite laugh which conceals embarrassment or grants an element of humor by courtesy to a boring statement is learned. So is the laughter which provides an outlet for nervous energy or conceals irritation or the laughter which is one means of showing superiority in a trying or embarrassing situation. A child who is brought up with a family where humor prevails learns to look at life in that more detached way. So through experience or learning, the individual comes to appreciate varied types of humor, broad or subtle, absurd physical phenomena, word play, surprised incongruity, absurd relations, burlesque. Through experience the child learns to appreciate the funny side of things, quickly to perceive surprising or incongruous relationships. Unfortunately it is usually a simpler thing to see the fun when some one else is the victim than when the joke is on oneself. Past experience largely determines this perception of relationship, of relative value. Obviously if a joke is to be shared, the fun is to be common property. It is important that others should perceive the same relationship. A sense of humor may be lost temporarily as the result of fatigue or self-consciousness or an undue feeling of importance.

Laughter, the perception of the humorous and the ridiculous, are all quickly conditioned. "While laughing is unlearned, we

learn what to laugh at, for the most part, just as we learn what to fear."<sup>13</sup> Diserens<sup>14</sup> in reviewing the literature concerning laughter suggests that laughter "is at once a biological mechanism of adjustment, a physiological safety valve, a psychological exhilarant, and a regulator of social relations." The spontaneous laughter of the baby, which in the first place is largely the expression of a feeling of well-being, comes to be called out by a variety of situations depending upon the teaching he receives directly or indirectly from the adults and older children with whom he is associated.

A capacity for seeing the humor in a *contretemps*, a sense of fun, even that perception of relative values which is called a sense of humor, all these are developed, or remain undeveloped or are distorted, by the experiences of the child and by the attitudes which he sees about him.

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## CHAPTER XI

### SEX

The semimonthly measurements of height and weight of the nursery school children are made without clothes. One day four children, two boys and two girls, were sitting on the floor in various stages of dressing and undressing. Each child was busily at work, lacing or unlacing shoes, buttoning or unbuttoning clothes without paying any attention to anyone else. When his turn came, he stood on the scale or climbed on to the measuring board with no sign of self-consciousness.

Here was perfect modesty because each child was conscious of his activity, of what he was doing, and thought not at all of himself as the doer nor of his body as independent of the activity in which it was engaged.

The two adults were absorbed in their work of weighing and measuring, of tying shoes and buttoning buttons, when suddenly one of them, pausing for a moment, looked at the room and, realizing the complete lack of any self-consciousness, said, "In my day this would have been impossible. For three-year-old boys and girls to share a dressing room would have been unthinkable. Yet here we work quite unconscious of what used to be called modesty."

### ATTITUDE TOWARD SEX

This change in attitude has come first of all on the part of adults, for attitudes of modesty and sex consciousness are transmitted by suggestion from one generation to the next.

The causes of this changed attitude are found in the return to a more simple view of sex; that is, we are recognizing that sex is an integral part of life rather than believing it to be a transitory and limiting element added to a creature already complete and perfect. Since sex is inherent in human life and, biologically, makes for variation and for greater complexity and development of the organism, we do violence when we take sex out of life and

set it apart as a thing in itself. Only when it has been so separated must it consciously be put back.

A wholesome attitude toward each of the body functions is brought about by increasing respect for the body as an instrument. Perfection of bodily activity and form involves both freedom of functioning and beauty of structure. When the body is looked upon as an instrument rather than as a hindrance, self-consciousness is merged into a free use of the body.

Further knowledge regarding the growth of the child's perceptions has brought an increased understanding of the child's legitimate interest in his body and has explained his curiosity about its various parts—his hands, his feet, his genitals. It must be remembered, however, that the richness of the sensory experience connected with the external genitals increases interest and may lead to an effort on the child's part toward prolonging or experimenting with the sensations so easily aroused. The anatomical connection between the genitals and the organs of elimination, coupled with the unpleasantness associated with the results of elimination, tends to augment the sensory experiences. However, now that adults have come to accept this curiosity as a perfectly natural one, there no longer is the incentive or the need for satisfying it gradually and by stealth.

In no phase of learning is it more difficult for one generation to prepare another for the new world in which it must live and function. The needs of one generation are but seldom the needs of the next. Demands differ, sources of satisfaction vary, increasing power over natural resources so changes the course of life that one generation is but little guided in planning the way of the next.

Training the child so that he shall be able to live wholesomely, without denying the appetites which make for the continuation of the race and without attaching to those appetites undue significance, is possible only when the adults responsible for that training are flexible and forward-looking. To aid the child's interpretation of his own physiological and emotional needs in terms of a changing social order is the difficult obligation of each older generation.

Inhibitions, habitual attitudes are almost inevitably transmitted. Fear that bad sex habits may develop in the child leads

to a denial of sex as a growing appetite in a growing human being and to an overemphasis upon the dangers involved in this growth. The desire to establish inhibitions leads to the building up not only of undesirable sex attitudes but also of the idea that eliminations are mysterious and shameful. There is no doubt that much constipation has its origin in such connotations.

Sex, however, is omnipresent. This universality was expressed by the old man of whom Emma Henton tells. "How many children have ye, Mrs. H.?" "Two," was the answer; "a boy and a girl." "Oh, then ye've as many kinds as the king." This fact of sex differences, because it is universal in the child's experience, has no emotional connotation for him any more than does the fact that all normal beings have two arms, two ears, and two feet. Because, however, of the emotional significance which comes normally with sexual maturity, great importance is inevitably attached to this dichotomy and to anatomical disparity.

When the children of three and four were building a snow man, one child, three years old, insisted on making the snow man's genitals. From various remarks, it was gathered that she had been receiving a good deal of sex information, enough so that her mind was running along lines of the significance of sex and of the anatomical differentiation. A few weeks later, however, when this information had been digested and amalgamated with her ideas, her attitude became again perfectly casual.

One day at the table another three year old said, "Wouldn't it be nice to have a little kitty?" and a second said, "Wouldn't it be nice to have a little doggy?" while this third child said in exactly the same tone of voice, "Wouldn't it be nice to have a little baby? A baby grows in its mother's stomach" and then went on to a discussion of the food she was eating. She had made her contribution to the conversation just as casually and with no more emotional content than the other children.

Interest in unusual phenomena is freely expressed until social taboos have been sufficiently well mastered to inhibit free questioning. A four year old who had just returned from a visit to the college farm reported with interest, "The cow had a bowel movement," and another added, "Yes, and the horse urinated." The facts which, because of their frequent occurrence, their lack of importance, make no impression on the adult are for the

child worthy of comment. The child's interest, however, has no especial emotional significance. It is this lack of emotional connotation which makes the period of early childhood the time when information is received simply as information.

Certain differences in behavior are inevitable because of biological structure and function. For the most part, however, variations are greater within the sexes than between them. The types showing greatest differentiation, that is, those more distinctively feminine and masculine, are apt to be perpetuated through mating.

It is fortunate that increasing knowledge about physiological development has increased our understanding of the fact that sex development is a continuing process from infancy, although it is accelerated at the time of puberty. The reciprocal relationship between the thymus and the gonads makes possible increase in bodily size and development of skillful use of the body in order that the individual may function as an adult. Gradually, the endocrine secretions of the gonads stimulate the development of secondary sex characteristics. The significance of this gradual unfolding of structure and function is of the greatest importance in sex education.

Margaret Mead's study "Coming of Age in Samoa" has forcibly called our attention to the fact that storm and stress are not intrinsic in adolescence but are the product of friction between the powers inherent in approaching physiological and psychological maturity and an environment which limits the tentative expression of those powers.

Sex development enlarges all the powers of the individual. It is accompanied by new capacities for enjoyment, both those due to sex gratification and the aesthetic enjoyment due to the irradiation of other experiences, to the new connotations enriching familiar experiences. Since these enlarged powers not only bring new capacities for enjoyment but are inevitably accompanied by an increased capacity for suffering, maturity brings both assets and liabilities. Because the dangers and difficulties involved are great and far-reaching in their implications, education and training have tended to emphasize this aspect rather than the enlargement, the extension of powers, and the increased capacity for appreciation.

During the period of early childhood, attitudes toward sex are being developed through the suggestions which come from the attitudes of the adults and older children. These attitudes, while built up so subtly and almost indirectly, continue to be fundamental in determining the individual's entire thinking with regard to sex, marriage, and the family.

### SEX EDUCATION

This persistence of attitudes established in early life makes some sort of early sex education inevitable. The only question is with regard to the character of this education. Should it be conscious and definite? Should it attempt to anticipate the child's increasing needs? Should it content itself with meeting such needs as come to the surface through questions expressed in words or in attitudes or gestures?

These questions are answered in various ways, but there is a consensus of opinion regarding the difficulty involved in preparing the child so that he is ready to meet the needs when they arise. This difficulty only makes the obligation the greater. If such education is to function at all, it must be in terms of the child's interests and capacities. One of the principles of learning which seems to permit of no exception is that knowledge to be significant must be related to knowledge already possessed and that generalized habits are developed out of specific ones. In no other field of learning has the fiction of a general transfer of training clung with greater tenacity. No doubt this is due in part to the recognition of the need for preventive education and in part to the hope that information may be completely absorbed and therefore available when need arises.

Another difficulty lies in the fact that education involves experimentation. Experimentation, however, in any phase of education so intensely entering into the emotional life of the individual is fraught with great difficulty. Undoubtedly the growing individual orients his sex behavior through trial and error. Such orientation is inevitable but may occur in no obvious fashion. Perhaps one of the safeguards inherent in what is called modern freedom lies in the openness of opportunity for such trial and error learning.



It must never be forgotten, however, that such experimentation is always in terms of, and on the level of, the child's own development. While in the sexually mature person, experimentation may be in terms of what is called "free love" or even in a more or less aesthetic promiscuity, experimentation in a growing child finds its scope in tentative approaches.

The four-year-old girls who insisted that they would stand up at the toilet as they had seen the boys do were content only when they had demonstrated to their own satisfaction the anatomical limitations involved. The rough-and-tumble play of pre-adolescents, the more or less furtive contacts covered by a pretended casualness are experimental at that stage of development. As sexual maturity, both physiological and emotional, proceeds, the field of experimentation enlarges and becomes more complicated. It is the problem of the older generation to safeguard such experimentation without preventing it, without warping it by imparting to the child premonitions of the possible dangers. Unwillingness to live dangerously may be an indication of the onset of age. Perhaps it is permissible to say that the very dangers involved contribute to the zest with which youth experiments.

The earliest phase of this experimentation is in the realm of sensation and perception. Chance contact with the genitals arouses a richness of sensory experience which in turn leads to a repetition of that contact. While adult significance is absent in childish masturbation, there is sufficient gratification to facilitate the repetition of the experience. The child's first awareness of his genitals is augmented by the taboos imposed upon such awareness. It is a fortunate child who does not promptly learn that it is wicked to see, touch, or mention those particular parts of his body which to him are of especial interest.

Such taboos were enforced by belief in the inevitably serious results such as insanity or feeble-mindedness. Fortunately these exaggerated fears have been dissipated through increased information. On the other hand, continued masturbation is a waste of nervous energy, diminishes the child's control of the organs of elimination, and arouses a desire for stimulation which leads to frequent urination. To state that masturbation rises out of a perfectly natural awareness, that it is apt to be

transitory, and that in such a case it has no particular significance does not solve the problem of the child whose masturbation has become habitual.

Acidity of the urine, discharge from the mucous membranes, irritation from tight clothing, lack of scrupulous cleanliness—such physical factors by calling the child's attention constantly to his genitals may serve to increase the habit. As is always true in the case of undesirable habits, the removal of any possible physiological cause is the first step. The next in importance is the building up in the child of interest and activities which will provide wholesome and legitimate outlets for his energy.

So simple a procedure as teaching the child to sleep with his hands above his head not only serves to diminish the possibility of masturbation but conduces to the development of good posture. Anxiety and concern which come from knowledge of the possible consequences find relief in taking positive measures. Repressive measures, however, transmit this concern to the child, thereby increasing his interest in a practice which becomes mysterious.

It seems of little use to advise parents to pay no attention to this habit, to regard it merely as a phase of development. Yet our ignorance with regard to measures for prevention and relief limits us largely to such admonitions.

Sex education involves the establishing of habitual attitudes. It must always be remembered that while sex education may be a means toward the establishment of desirable or undesirable attitudes, it proceeds inevitably in the child's development. Consequently, what is called sex education includes not merely the establishment of desirable attitudes but, in addition, the prevention of undesirable or unwholesome ones.

One long step in advance was taken with the realization that restraint is not the goal. Repressive or restraining measures, in that they are negative methods, are more apt to break down under strain. The building up of personal standards of behavior may be a more difficult procedure but results in the long run in a more adequate, forceful, and significant training. The basic idea is that the energy of the individual should be focused toward the achievement of permanent and lasting satisfactions rather than dissipated in temporary and inadequate ways. Self-control is no longer identified with inhibition but means rather the

protection of interest and energy so that they may function effectively.

The necessity for preservation of the group has from earliest times made desirable a social control of the function of sex. Human infancy is indispensable if the gains of the group are to be perpetuated. One result of the plasticity of infancy is its dependence upon protection. It is, therefore, of the utmost importance to the group that some sort of training should shape the attitudes of the growing individual toward a function which, while it has its roots in earliest infancy, yet does not function until maturity is reached.

Sex education, as a part of a curriculum or as subject matter, may be defined in terms of warnings of the dangers resulting from unwise sex practices, of the dangers due to disease, or it may take the form of information regarding what are called "the facts of life," meaning the biology of reproduction. Finally it may build up an emotional control which comes from respect for the self and results in what is sometimes called an ethical attitude.

While information alone is inadequate, biological information is indispensable. In addition, the individual requires information regarding the emotional connotations both within himself and as expressed in convention. Conventions are limited because of a cultural lag; but, because they represent the emotional and intellectual attitudes of the group, they do possess an essential value. The vote against convention has no doubt come about because of this cultural lag and also because the older generation makes obvious to the child the restraining function of convention but does not make clear to him the freedom which comes through control.

The beginning of respect for convention may come early in the child's life. A four-year-old boy said in a confidential tone of voice, "When we need 'attention' we say it quietly." There are few parents who have not been embarrassed by the amusement of adults when a little child fails to make his wants known quietly.

The complexities of modern living involve sex as well as every other human capacity in their folds. Sex expression cannot be completely spontaneous and impulsive but is from early childhood

related to ideas and modes. Consequently *learning* is necessary in this sphere as in every other.

Increasing knowledge of biological functioning removes more and more from the realm of the mysterious the processes by which the group is perpetuated. Analogy of the fertilization of flowers and the lower animals is insufficient, because there is no direct connection evident to the child. There is too great a discrepancy between human reproduction and reproduction on a level which involves no active participation on the part of the individual or on a level which includes so far as we know neither thought nor idea. The formula which applies universally is that the information given must be suited to the child's own need and development. To state this is easy; to put it into practice requires wisdom and discretion. It is all an impersonal matter with the child, but the adult finds it almost impossible to avoid a tendency to refer any sex connotation to himself.

It is because sex in the human being is not only inherent and inevitable but in addition includes a rich emotional accompaniment (pleasurable or not) and ideational components that sex responses cannot function satisfactorily without learning. Every human appetite to be satisfied in a civilized society must necessarily be submitted to a process of training.

It is the difficulty of this training that gives rise to the vast amount of literature dealing with "sex education," underlies the activities of the Society for the Suppression of Vice, and opposes the giving of information with regard to contraception.

Unwilling to admit the impossibility of perfect freedom and spontaneity in sex relationships, dazzled by a fairly-like conception of freedom, adults of this generation find it difficult to refrain from imposing their attitudes upon the younger generation. The much talked-of adolescent knows more about sex behavior than many of his elders and may be practicing while they talk.

The child is quite unable to consider the universe as existing without himself. His inexperience and his inadequate information may make this idea an overwhelming one for him. For other children, the first impulse for information has come from their desire to know "who made me." Both questions, "Where did I come from?" and "Who made me?" arise from the desire to

orient oneself with regard to a universe which is continually extending itself.

Because we realize the importance of children's questions we are apt to overcorrect for past failure and to assume not only that every question *must* be answered but also to read into questions an adult significance and to give a more mature answer than the child requires. This point may be illustrated by a query regarding another mystery. A boy of four was talking very seriously about the destruction of mice, asking questions about traps, which apparently grew out of a recent household difficulty. Finally he said, "When a mouse is dead, where is it? Does it go to heaven?" To gain time the adult replied, "What do you think?" and the boy said in a casual, conversational tone, "I think the garbage man takes it."

The same sort of thing happens with regard to sex. Another four-year-old boy called a new two year old, a curly headed boy who wore rompers, a girl. When the student teacher said, "No, he is Paul, he is a boy, not a girl," the first replied, "What's the difference?" but was perfectly satisfied when she wisely answered, "He looks like a boy, he doesn't look like a girl."

The child's questions are to be answered honestly to the best of one's ability and with the thought in mind that the child is interpreting the answers in terms of the content of his own mind and by means of the signs given him by attitudes verbally unexpressed but no less significant and obvious. It is easy to make the mistake of giving more information than that demanded by the child's question. The correct information should be given before the wrong has a chance to be received, but it must wait upon the child's interest for its effectiveness. A child frequently fails to perceive an obvious detail because, not being connected with his own experience, it is outside his own range of thought.

It is necessary to distinguish between the casual question which neither expects nor needs answer and the actual search for information. The search for information may have no sex aspect for the child. "Where do babies come from?" is of the same category as the question as to what holds the stars in the sky. The child's curiosity is intermittent, the information which satisfies him at one time may fade out so that he may need repeated explanation. A group of college students were discuss-

ing their own early sex training. Several said that, although all memory of the incident had faded out, they had later been told that they were given sex information as soon as their curiosity was aroused.

There is uniformity of agreement that curiosity on the child's part should be satisfied with information suited to his need—in other words, that intelligent questions should be intelligently answered. There is, however, no agreement as to whether information should be given to the child who asks no question. This absence of questioning may mean that the child has not yet begun to think about the subject, or it may mean that he is getting his information from other sources. In the latter case, the difficulty lies in the possibility, almost a certainty, that such information may be not only erroneous and inadequate but, in addition, may lay the foundation for unwholesome attitudes. Some authorities feel that it is better to run the risk of arousing curiosity and that the giving of useless information is a negligible matter, while the danger of erroneous information leads to such serious consequences that the risk is unthinkable.

There is danger that information given in advance of the child's need may, by arousing his curiosity, stimulate him. To stimulate sex curiosity, to awaken it deliberately is to set in motion a tremendous train of consequences. The responsibility rests upon the shoulders of the adult who feels himself privileged to draw from general principles a specific conclusion regarding the imperative need of sex instruction, irrespective of the previous curiosity on the part of the child.

Out of the fundamental biological facts has grown a vast body of ideas regarding the differences, rights, privileges, and obligations of sex and its expression. These ideas change and modify themselves, although with considerable lag, to meet a changing civilization. Taboos are altered as social structure changes. Ideas alter as economic status is modified. Yet this body of ideas is transmitted from generation to generation. Any attempt to offer sex education must concern itself with this aspect as well as with the imparting of information regarding physiological or anatomical facts.

It must always be borne in mind, however, that there is no possibility of giving moral, emotional, or character education as a

separate entity. It must come as a component part of general information. In the early years of childhood the most potent source of such education lies in the standards and attitudes of the adults who are responsible for the care of the child.

Sex instruction may be direct, coming through the tales of other children, through the observation of animals or human beings, through information either sound and adequate or the contrary, coming from parent or other older person. The importance of giving a child a vocabulary, accurate and serviceable, cannot be too greatly stressed. The child's interest in names is extended to include the parts of his own body and the functioning of those parts. Through the use of the correct terms, the basis for an adequate sex education is laid.

Accurate, scientific information may be absorbed but kept quite separate from the warped or otherwise undesirable notions picked up in the street or elsewhere. Mrs. Dennett suggests a comparison of vulgar and technical terms as a possible way of bringing together those two groups of information which are apt to be carried in separate compartments. If sexual terms in the vernacular are listed parallel with the scientific terms, the connotations of secrecy, the esoteric qualities in the former will disappear. Destroying their separateness incorporates the two bodies of knowledge.

Sex instruction may be indirect, coming through silence or through a policy of doing nothing, which even though negative are definitely methods of sex instruction. Sex instruction may come through conditioning due to an unfortunate experience, such as witnessing intercourse, being abused by an adult or another child; or it may come from negative adaptation due to the attitude of cynicism, indifference, or brutality on the part of adults; or it may come by way of positive adaptation. Exciting stories, pictures, conversation, an attitude of secrecy, mystery, or prudery which lends an undue importance to matters involving sex—these also may be contributing factors. An ascetic attitude which minimizes the importance of sex, denying its emotional significance, is another possible method of training. Positive adaptation may be due also to heightened importance arising out of unwholesome emotional attitudes on the part of adults.

It must always be kept in mind that whether sex instruction comes directly or indirectly or by mingling of both, no child fails to receive instruction in matters of sex. From babyhood, emotional attitudes are being established which will accompany him throughout life. From earliest babyhood, girl children are trained as girls and boy children as boys. The pink and blue ribbons of the layette are only the tangible expression of this fundamental principle of sex education which has its root in the biological function of the two sexes.

The separateness in training is now less marked than in former times. Given equal chance, boys and girls enjoy the same play activities. Appreciation of the fact that the so-called masculine and feminine traits are not equally present in individuals, that there is temperamentally no complete dichotomy but rather a continuous distribution from the most completely masculine to the most completely feminine, has modified notions of sex education.

Because sex affects all aspects of life, attitudes toward sex are the resultant of all the experiences of the individual. Sex education then involves, on the part of the older generation, a clear notion of the attitudes and ideas that are wholesome and desirable and of the means for their development.



## CHAPTER XII

### LEARNING TO TALK

Adults are so highly practiced in speech that it is almost impossible for them to recall any of the arduous learning process by means of which this fluency was achieved. In states of extreme fatigue or illness, insight is given into the intricacy of speech and the perfection of the motor coordinations involved.

#### THE BEGINNING OF SPEECH

The reflex birth cry is the result of a necessary accommodation to a new environment. Change in temperature produces a gasp which in the form of a cry initiates the breathing process. This inevitable adjustment is accompanied by, or is due to, discomfort. It is, therefore, to be expected that any distress or annoyance should produce the same response. Since alleviation of the distress stills the cry, the cry comes to be a demand for relief. These reflex cries become emotionally toned as they develop into a method for calling forth a remedy. By the end of the fifth week this primitive squall has become differentiated into special cries indicating hunger, pain, anger.<sup>1</sup>

The baby at birth is equipped with the necessary apparatus for vocalization. One of the by-products of the birth cry is the setting into motion of this mechanism. Development of speed and accuracy is essential for development of speech and depends upon practice in vocalization.

Such progressive appearance of speed and accuracy comes by way of random movements. The column of air expelled from the lungs sweeps across the vocal chords, causing sound. This sound, having been shaped in varying forms by the chance position of the mouth and lips, apparently gives the infant pleasure. Auditory sensations thereby aroused stimulate a repetition of the process, so that what is called babbling develops.

Miss Shinn calls attention to the way a baby turns his common chattering sounds to special uses. For example, he makes use of

these combinations of sound to relieve his mind by exclamation rather than as a means of communication. There is also a playful manufacture of sound for its own sake which is of great importance in developing that skillful coordination of the vocal mechanism necessary to articulate speech.

This vocal play continues to give pleasure even after the child has mastered speech. One three-year-old boy whose enunciation was unusually distinct and whose vocabulary was remarkable frequently amused himself by such vocal exercises, manufacturing all sorts of unusual sound combinations. Much adult small talk and nonsense apparently arises from a similar source—it quite obviously is vocal play and is indulged in for the sake of the pleasure the speaker derives from it, rather than as communication or even for the amusement of possible auditors.

By means of this vocal play the baby develops the various motor coordinations that make speech sounds attainable. The importance of these vocal habits is indicated by the contrast between the ease with which young children and the difficulty with which adults master sounds not used in English speech but essential in speaking a foreign language without accent.

Long before language has been mastered, the baby shows great facility in producing sounds and combinations of sounds in automatic babbling but no capacity for voluntary production of these same sound combinations. He even babbles whole sentences of meaningless sounds—"tonal patterns" Hollingworth calls them. It is as though he fluently spoke another language. This experimentation with the production of sound which goes on almost continuously during the baby's waking hours is carried on for its own sake. In such spontaneous vocalization the combinations of sounds that appear in speech are used fluently. Conscious production of the same sound combinations is made with difficulty; the deliberate and purposeful use of the coordinations involved follows their spontaneous appearance.

Gradually the infant's cries become differentiated; as Wylie suggests, the vowel sounds are unchanged but the tones of the voice are varied to express different emotions. As these vowels develop in greater variety and are combined with consonants, babbling appears. Babbling, however, is not speech but rather one of the steps toward speech. It is an interesting aspect of

speech development that the word sounds which a baby learns to make are, for the most part, the sounds he hears. Some acquire the characteristic vocal habits of the south, others of New England. The English voice is even more distinctively English than are the word sounds. Another fact that should not be lost sight of is that a baby cared for by a native nurse speaks correctly both languages—that of the parents and that of the nurse. Young children of missionaries often show a remarkable facility in this respect.

In learning to talk, the conditioned response plays an exceedingly important part. This conditioning occurs both in child and in parent. On occasion the child's spontaneous and random combinations of vowel and consonant occur at the same time as the approach of an object. This random sound is received as a word by the adult. For example, "ba" seems to be a fairly common infant symbol for the adult word "bottle." Ba is sounded when the column of air forces the lips apart. If this by chance occurs at the moment the baby is offered his bottle, the adult assumes that the baby is trying to repeat the word bottle which has been spoken in connection with the offering of the bottle. Frequently this term is adopted by the adult.

If the word bottle is spoken when the object is offered the baby, the latter learns that a certain combination of sounds stands for the object—in other words, an auditory stimulus is substituted for a visual. The process of learning is speeded if names are pronounced when the child is given or shown an object. Thus through conditioning words are learned. Auditory stimuli other than words function in the same way. The peculiar siren that screams at breakfast time means on one campus 8:05 a.m. But the same sound at two in the morning means either fire or fire drill. In the first case the response is a glance at one's watch; in the second, preparation to escape from a burning building.

Sounds as substitute stimuli function in the same way in the baby's world. Such learning by conditioned response paves the way for the learning of words and phrases. Scrutiny of the rôle of slang as a substitute stimulus in the adult's life aids comprehension of how phrases acquire significance for the baby.

It is through the process of conditioning that words acquire meaning. They are symbols and, as symbols, they gather power

to initiate responses. Understanding of the significance of words and phrases may be acquired before capacity to pronounce or to make use of the words in voluntary speech.

Speech is the vehicle for acquiring and imparting information and, as such, facilitates thinking. The ideational and the motor aspects of speech accompany, aid, and interfere with one another. At times, comprehension precedes pronunciation, understanding outdistances voluntary use of words; at other times, use of words outdistances comprehension, as in echolalia or parrot repetition.

The vocal play of babbling not only lays a foundation for the speaking of words but also continues into later years in playful alterations of word forms. Calling names begins as a form of verbal play, although the derogatory connotations soon obscure this original factor. Vulgar words also are practiced, in part at least, for their verbal or auditory quality.

Although the learning of words is not bound up with the acquisition of ideas, the relationship between words and ideas is a double one. Ideas are communicated by words, and understanding of the meaning of words, vocabulary, may clarify ideas.

Sully, who calls the child the "namer of things," says that the greatest discovery in the life of the child is that of the functional importance of words as signs, that words are tools.

Inexpert use of words, due to uncertainty as to the exact meaning of the words in common usage, is one of the sources of charm in children's speech. The child who said, "The elevator oozes down—it's my favorite slow" described her experience more vividly than if she had used the customary words worn thin by use. With the same picturesqueness, a boy of two, who had been spattered with water, complained that the other child "got a drink of water on my neck," and a four year old described his chapped hands as "rusty."

Not only does the child's use of language lend vividness to his speech; oftentimes it reveals also a lack of understanding. One day the four year olds were going to visit the college greenhouse. As they came in sight of the building, one said, "That's not a greenhouse, it's a flower house." "No," replied another, "it's not a greenhouse 'cause it's painted white."

If ideas outdistance the perfect working of the vocal organs we may have stammering or stuttering. S., for example, seemed to labor under a great pressure of ideas which demanded expression. It so happened that his vocal mechanism functioned with some difficulty. Strain was shown by the rising pitch and increased volume of the voice. In E. a similar intensity of idea coupled with motor inexpertness was shown by the repetition of syllables and initial consonants. Flow of idea was so great that the motor mechanism broke down. The parents of both two-year-old children were concerned lest serious speech difficulty develop. With increasing flexibility of functioning of the speech mechanism the difficulty disappeared. In D., another two year old, the desire to express is equally great, but motor control is so perfect that ideas are clearly enunciated.

The difficulty with which the pronunciation of a new word is mastered is sometimes very great, even though these same sounds are freely uttered in spontaneous vocalization. A child practices with intense concentration and persistence the pronunciation of a new word. This may go on until the reiteration becomes disturbing to the adult.

The mouth capacity of the infant, according to Jespersen, is much less than that required for the production of normal speech sounds. Because of the incompletely developed mechanism and also because of inexpert control of this mechanism, the baby at first speaks a greatly simplified language. A single syllable is made to do duty for two or three. The accented syllable is the one apt to be used, consonants more easily produced are substituted for harder ones, and vowels are modified.

The imperfect functioning of the motor apparatus brings about the "scamping" of baby speech, the simplification of words. "Cracker" becomes "c'acker" and "swing" is "'wing." The alterations due to imperfect motor control affect the consonants more than the vowels, but quality of the latter may be altered.

It does take time for the vocal apparatus to learn to function perfectly. Moreover, since the child speaks as he hears, he should have the privilege of a good model; if he is to learn the exact sound, he must hear the correct sound.

Clipping of words occurs in the speech of both adult and child, but as a rule adults keep the beginning of a word, while very

small children perceive or remember only the end of a word and use that for the whole.<sup>2</sup> The ease with which these clipped words are understood by the child is amazing. A three-year-old girl, who evidently had been warned against too great a tendency to manage the affairs of other people, remarked "I'm not going to boss Ann any more." D., also three, overhearing her, immediately contributed to the conversation by remarking, "We slept in Boston on the way back from Maine." Here the syllable "bos" was interpreted with quite a different meaning.

The facility with which children interpret each other's speech, no matter what the variety of imperfection, is surprising, for very often another child understands clearly what is meaningless to the adult.

The child's limited vocabulary, his incomplete mastery of motor coordination coupled with his intense desire to speak make for directness and simplification of speech. The meaning of a whole sentence is intrusted to a single word. "Up" conveys a request and expresses an intense desire. Any word may be used as a verb with sentence meaning. A little later, subject is used as well as predicate—"Mamma go"; "Me swing." Complete indifference to parts of speech and to grammatical construction makes it possible for the child to express his meaning long before he has learned the intricacies of language forms.

#### THE CHILD'S USE OF LANGUAGE

Flexibility marks the child's use of language. He "uses different words and forms different kinds of sentences with every change in environment."<sup>3</sup> Boyd describes the special speech idioms characteristic of the two year old as:

- a. A dearth of prepositions, articles, and auxiliary verbs.
- b. Frequency of elliptical constructions.
- c. Amplification or correction of a statement as an afterthought.
- d. Inversion of the usual order of speech.
- e. Frequent omission of grammatical inflections.

Studies of the development of language have very largely concerned themselves with increasing vocabulary and with sentence length. These studies were summarized in 1926 by Madorah Smith.<sup>4</sup> All the words used spontaneously during

periods of free activity were recorded and analyzed. The following conclusions were drawn: (1) "The number of words per sentence increased with age from two to four and a half years." (2) "The number of words used per hour increased with age during this period." (3) "Declarative sentences predominated at all ages." (4) "The repetition of identical sentences decreased with age." (5) The ratio of complete to incomplete sentences was significantly greater at three and at four years than at two. (6) At two years verbs, nouns, and adverbs were more frequently used than adjectives and connectives, and at three and four years verbs and pronouns were more frequently used than adjectives, articles, interjections, and connectives." (7) There was a significant decrease from two to five years in the percentages of adverbs that express place and manner as compared with those of other types. (8) "Other trends that may be significant, that were found from an analysis of the conversations recorded, were a decrease with age in the proportion of simple sentences to complex and compound sentences, an increase in the number of questions asked and a decrease in the number of exclamatory sentences as the child grows older, and a slight increase in the use of pronouns and adjectives and of abstract nouns. (9) The ten words most frequently used were: I, is, it, you, that, do, a, this, not, and the."

In studying the extent of vocabulary Smith found that if "children of the same age with equal mental ability were paired according to social status, the higher social class showed a higher average of words known." The order of birth has no significance in relation to the size of vocabulary after two and a half years. At two and three years girls had acquired a few more words than boys, but after three years of age the sex factor is not important. The most significant factor in increase of vocabulary is that of mental development. The 273 children tested ranged in chronological age from eight months to six years; the size of vocabulary ranged from 0 to 2,500. The average vocabularies at the various ages are shown on page 188:<sup>5</sup>

The little child's use of language parallels, and is an expression of, social growth and awareness of other people. It must always be borne in mind that the capacity for using language is developed through practice. Harriet Johnson in her discussion of language<sup>6</sup>

Age	Number of Words
8 mo.	0
10 mo.	1
1 yr. 0 mo.	3
1 yr. 3 mo.	19
1 yr. 6 mo.	22
1 yr. 9 mo.	118
2 yr. 0 mo.	272
2 yr. 6 mo.	446
3 yr. 0 mo.	896
3 yr. 6 mo.	1,222
4 yr. 0 mo.	1,540
4 yr. 6 mo.	1,870
5 yr. 0 mo.	2,072
5 yr. 6 mo.	2,289
6 yr. 0 mo.	2,562

says, "Vocalization takes its impulse from the desire for muscular activity before communication enters into awareness." While speech is an activity of the vocal mechanism, it must be distinguished from language or communication. Increase of vocabulary is the indication of growth and of satisfactory functioning of the individual in his environment. If the child's environment offers an abundance of opportunities for activity, words expressing action are apt to predominate. The child delights in sound as an accompaniment to his activity. This sound accompaniment may be of his own making, such as grunts, shouts, squeals, followed later by syllables utilizing a wide range of consonant and vowel sounds and a great differentiation in pitch and inflection. Finally come words, phrases, or sentences. In the second place, when confronted with difficulty the child gives expression to a vocal accompaniment.

The characteristics of early speech patterns according to Johnson are:<sup>7</sup> (1) Speech responses are closely associated with and accompany postural activity. (2) They are often rhythmic in form. (3) Enumeration, repetition, and reiteration are common. (4) Questions are frequent and often express a desire for social contact. (5) Words or syllables recalling sensory and motor experiences are common. (6) The child's language deals largely with his own activities and experiences. (7) Statements are brief and are in the form of episodes rather than narratives. (8) The child has a definite interest in being included in the



account of an event. (9) There is a rhythmic relationship between language reactions and bodily activities.

The child's experience of the world about him is richer in visual and tactual than in auditory stimuli. Such sound stimuli as are provided for the little child are apt to be blurred rather than pure tones. A zyllophone, for example, gives the child an auditory experience which tends to obliterate the quality of the individual sounds unless each key is suspended in such a way that it can be struck only separately.

Johnson calls attention to the importance of enlarging the child's experience and of preserving his sensitivity to auditory impressions through practice. It is obvious that auditory activity has a special relation to acuity. Moreover, auditory acuity is essential in the development of clear speech and quality of tone. The significance of this is illustrated by the voice changes which come with increasing deafness.

Words are used not only to express ideas and to communicate desires but are also of great significance as a form of play. This experimentation with language Johnson calls its art element.

"The young child seems to get satisfaction from his sound productions just as he seems to get satisfaction from his kicking or other experimental use of his body."<sup>8</sup> Mitchell describes the child's tendency "to say what he is doing as he is doing it," thereby intensifying his experience. She summarizes her discussion of children's experiments in language: "(1) that children talk to themselves without need of response; (2) that they seem to get satisfaction from such use of language; (3) that they talk what they act; (4) that much of their speech is rhythmic, often to the point of genuine patterns; and (5) that they report their observations in direct, concrete sense or motor terms."

If the child were not surrounded by individuals who use conventional word forms, he would never receive the sensory stimuli that make acquisition of a language form possible. If he grew up in a silent world or in one in which there is little opportunity for him to participate in conversation and thereby practice speech, his speech would be apt to be developed more slowly. One of the results of nursery school experience is the stimulation of speech due to the relationships with other little children. Not only do little children understand one another easily, not

only do they seem to need fewer and less complete symbols than do adults, but because they also speak to one another from more nearly the same level of development, they speak more freely.

Occasionally a child who talks fluently at home seems to be so overcome by the new social environment that his speech in the school is inhibited. One two year old was completely silent in the school, although she gave every indication of understanding clearly not only remarks made directly to her but remarks also which while not directly concerning her were made in her hearing. One day she picked up a toy telephone which another child had brought to the school and began to converse fluently with her mother.

Parents' first pride in the child's acquisition of language becomes somewhat tarnished when perfection of language leads to almost incessant speech. Delight in the new power is indicated by the continuous flow of language. Little children who have just mastered the essentials of language talk most of the time they are awake. Children talk so much because in reality they are thinking aloud. So also do adults under stress or when they are attempting to think their way through a puzzling situation.

Insistence upon the repetition of forms current in polite society may lead to a parrot-like repetition in which the content is unimportant to the child and the phrases have no function as communication. It is to be questioned whether injunctions regarding the use of such phrases as "please" and "thank you" are advisable. However, it is almost impossible for parent or nurse to avoid urging the child to respond to a greeting. It takes almost superhuman powers of self-control to avoid saying to the child "Say good morning to Miss So-and-So." As a matter of fact, the model set by home and school is far more effective than verbal injunction. The habitual use of polite phrases comes along with the child's realization of their efficacy as cues. Johnson speaks of the inattention developed by children who are "drowned in adult conversation."

Children do have an uncanny facility for repeating phrases and for using them in the proper context. S., aged three and a half, heard an adult remark to another child who, dreamily indifferent to what was going on about her, ignored what she

should have been doing, "I wonder what is going on in your mind." A few days later S. sat motionless, seemingly impervious to any suggestion that he should go on with the lacing of his shoe. Finally he looked up and said out of a clear sky, "I wonder what is going on in my mind now."

Piaget's "Language and Thought of the Child" has contributed to our understanding of the child's use of language. His emphasis upon the importance of what he calls egocentric speech and the differentiation between this and the use of speech for communication, that is, socialized speech, not only clarifies the development of the use of language but also throws light upon the development of the child's consciousness of, and interest in, other people.<sup>9</sup>

The functions of these two phases of language response in the child are, according to Piaget:

I. Egocentric (talks either for himself or for pleasure of associating anyone who happens to be there with activity of the moment).

A. Repetition (repetition for pleasure of talking).

B. Monologue (talks to self as though thinking aloud).

C. Dual or collective monologue (outsider associated with action or thought of moment but is expected neither to attend nor to understand).

II. Socialized speech.

A. Adapted information (interchange of thoughts with others).

B. Criticism (remark about work or behavior of others more affective than intellectual; assert superiority of self and depreciate others).

C. Commands, requests, threats.

D. Questions.

E. Answers.

The types of language response listed by Piaget may, however, "occur alongside of each other"; nor does the presence of one sort "justify us in assuming that no other would be found at the same age in different circumstances."<sup>10,11</sup>

Observation of nursery school children however confirms Susan Isaacs' findings rather than Piaget's; namely, children *do* direct their remarks to each other. Even though talk may not assume the typically conversational form, it is social in its activity, for it does affect the behavior of others and is in turn affected by their presence.

Koffka<sup>12</sup> calls attention to the sudden development of the child's vocal expression which comes about the age of eighteen months. This involves the use of the sentence rather than the key word which has had an affective tone or a wish characteristic. At this time there is a sudden increase in the size of the vocabulary; the name question appears—"Wa's 'at?"—the child is concerned with the naming of things, the word is freed from its affective relationships and enters into new relations with objects. The child finds ways for discovering the names of things. Some names seem to be devised as true inventions; words which were originally learned in connection with a definite object gradually extend their range of application and become generalized terms; new names are created by means of combining old ones. Such general words as "this" or "one" appear fairly early in the child's vocabulary, and causality comes to play an important rôle. This development is the flowering of practice and learning that have been going on since early infancy.

This facility with which the normal child acquires whatever language and whatever form of speech he may hear is a never ending source of wonder. Not only does he master the language of his parents, but also if he lives in a country in which another language is spoken he masters that also. He quickly learns to serve as interpreter. Even subnormal children surprise one by the facility with which they act as interpreter between the home visitor and the mother.

A little girl whose mother is French and whose father an American spoke both French and English at the age of two and a half. Her conversation was a mixture of the two languages, for she used the word which was easier to pronounce. For example she would say "shoe" instead of *soulier* and "hat" for *chapeau*.

The ease with which a little child adapts itself to the language needs of its environment is illustrated by Halidé Edib in the account of her childhood:<sup>13</sup>

The little girl did not realize that she spoke two languages, one at school and one at home. Language to her was a mere gesture, and one used one or the other according to the person who understood this or that way of expression.

Smith reports the language development of five children from the same family who were exposed to both English and Chinese.

She concludes that a change to an environment in which the child's language is not understood is apt to cause a temporary cessation of further attempts at speech. Confusion seems to occur when preschool children use two languages.<sup>14</sup>

Theoretically, one language should be well established before the child attempts to master another, lest the second interfere with the correct learning of the first. Whenever the question arises as to direct teaching of a foreign language before the native tongue is fully mastered, it seems wise to advise deferring such instruction. Spontaneous acquisition does occur with facility, however, and the little child never confuses language in reference to persons. For example, he speaks Chinese to his nurse but never to his mother. Probably here it is a matter of association. The native nurse serves as a stimulus which calls forth certain combinations of sounds, while the mother arouses completely different associations. The native woman's failure to respond to English words would serve to eliminate the use of such sound combinations on the child's part.

This early association of a given series of significant sounds with persons may account for the child's refusal to speak the foreign language in another environment. Young children who have acquired speech abroad frequently refuse to use anything but English when they return to America. M. W., for example, was the child of missionaries in China. At the age of three she returned to America with her parents. Although she had for months been talking Chinese fluently to the servants, she refused to use Chinese words in America. That she had not lost her vocabulary so far as comprehension was concerned was evident from her response to remarks in Chinese made by her parents. Apparently the stimulus for calling forth responses in Chinese (namely, a Chinese) was lacking, so she was said to have forgotten her Chinese or to refuse to speak it.

The function of particular objects in calling forth words which apparently are mastered and then forgotten could well bear study.

That acquisition of vocabulary is a matter of conditioned response has frequently been remarked. The interesting thing to note is that words become both substitute stimuli and substitute responses. That is, the word serves to call forth the response

first elicited by the object. The word in itself also becomes a sufficient response. The little baby quickly learns to show signs of pleasure at the prospect of going out of doors when he sees preparation being made—the sight of his outdoor wraps, for example. When he is a little older, the words “We’ll go for a walk, now” call forth the same response.

In the second place, words serve as a substitute response; sight of preparations calls forth a verbal response, positive or negative. A child may glance up from his play and catch sight of a glass of water approaching him. His only response is to remark, “I don’t want any.”

In the third place, words alone are used as both stimulus and response. This verbalization of behavior, in that it expedites human relationships and furthers the development of ideas, is one of the vehicles of both individual and group development. However, when it comes to suffice as a substitute for what the mental hygienists call reality, it is not so excellent a device. If words assume a fictitiously independent existence apart from performance, their use as substitute stimuli and substitute responses is carried to absurdity and becomes no longer a tool but a hindrance.

Communication is both perceptual and linguistic. An approaching pedestrian is automatically avoided except when one’s mind is so occupied that the cue for turning to the right is missed. One either walks into the approaching individual or else for an embarrassing moment hovers undecided between going straight on and turning to the right. Visual stimuli reinforce the auditory in modifying behavior. This modification through visual perception of objects involves habits but not ideas.<sup>15</sup>

The acquisition of language involves either a handling response or a vocalizing response or both. In considering the development of fluent speech it is important to recognize that the child’s speech reaction is finally made up of visual, auditory, and kinaesthetic stimuli. A word pronounced by an adult provides an auditory stimulus which may resemble the random sound made by the child. This auditory process supplements that which released the original incomplete spontaneous sound. The repetition of the word by an adult together with the modification of the sound by the child in order to resemble more closely the

word of the adult brings the child nearer perfection of the speech response. In addition, the adult may intensify the impression by repeating the sounds more energetically. Weiss suggests that the essential elements in establishing an oral language reaction are: (1) the reaching and grasping reflexes which enable the child to handle and manipulate the objects presented to it; (2) the vocalizing reflexes. In the learning of any given name these two responses interplay. The verbal phrase "baby wants" is gradually acquired as a means for bringing an object within handling distance of the child's body. The individual language response may be aroused in many ways. "Many different stimuli may release the same word reaction." This process is known as generalization, "a type of sensori-motor mechanism in which many different receptor patterns, representative of many different sensory situations and relations, are connected to the *same* language response." Through "this common path the individual may react in a specific manner to all objects, situations, and relations which are thus connected," although there is but little sensory similarity between them. Generalization comes as the result of experience and depends upon the developing mental capacity.<sup>16</sup>

Language is a double-edged activity functioning as a response to a stimulus or, on the other hand, serving as stimulus for a response. This response may be in the form of speech or articulation on the part of another human being. In Allport's phrase, the child "learns to use his naming habits as commanding habits." In the beginning, the language of gesture develops from spontaneous and serviceable movements. For example, the head-shaking gesture which is a generalized response develops out of the turning of the head in order to prevent undesirable substances touching the lips or entering the mouth. This simple avoidance or withdrawal becomes conditioned so that sight of an object calls forth the same refusal. In turn this movement serves as a sign which is understood by the individual offering the resisted substance.<sup>17</sup>

The side-to-side movement of the head is made with less effort than the up-and-down movement. It may happen that the baby apparently refuses food but expresses dissent without actually meaning to refuse the offered object or service. The

response of turning the head has not on his part been sufficiently differentiated or endowed with the negative meaning. After somewhat the same fashion, negative words enter the child's vocabulary before affirmative. When offered food or when asked if he wishes something, the baby may say "no" because as yet "no" is a response including both affirmative and negative meanings. This negative attitude, which is apparent rather than real, may be "taken very seriously by adults and so much insistence made upon immediate acquiescence that it sometimes persists and becomes a deep-seated pattern which proves a stumbling block to social behavior."<sup>13</sup>

Difficulty of communication is complicated by the inexperience of the child who has not yet mastered the technical means, yet communication of some sort is essential for group activity. Since it is through some means of communication that the activities of individuals are coordinated and that responses to objects are interpreted by one's contemporaries, communication is necessarily involved in the idea of group relationship.

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## CHAPTER XIII

### LEARNING TO EAT

#### PSYCHOLOGY OF NUTRITION

In these days of vitamins and calories and of balanced diet, it is well to remember that, important as are the chemistry and physiology of nutrition, there is also a psychology of nutrition. It is not the food that appears on the table that nourishes the body and generates energy, nor even the food that is eaten, but rather that which is assimilated into the blood stream.

In this process of eating and assimilation the psychological factors play a large part. Food is not an end but a means by which life is prolonged and made more zestful. For the adult the end served by food is maintenance of energy; for the child, however, growth as well as energy must be provided for.

#### CUSTOM IN DIET

Custom and habit largely determine what we shall eat and how we shall eat it; whether we shall eat with chopsticks or spoon, three times a day or five. The custom of the country holds sway in respect to food as well as in other fields. Until modern refrigeration and transportation made possible wide distribution of products, people lived on those foods which grew or were produced in the vicinity. So the gaucho subsisted largely on a meat diet, the seacoast dweller used fish, and the American Indian ate corn. Provincialism with regard to food is the result of learning on the part of the child; as someone has said, the Mason and Dixon line is the line between light bread and biscuit. Enjoyment of a wide variety of foods comes also by way of learning.

Stefansson<sup>1</sup> gives an interesting account of the refusal of his dogs to eat unfamiliar varieties of fresh meat and says that he had to *teach* them to eat the new varieties. When this meat became putrid any variety was devoured with equal readiness

because differences in flavor were blurred. Dogs over a year old, that from puppyhood have had a restricted diet, always refuse a new food at first, while dogs that are accustomed to many sorts of food will readily eat and add a new one to their diet list. Stefansson goes on to say that he finds that men "well brought up" are ready to try anything because they are used to many sorts of food, while those "poorly brought up," that is, used to a limited diet, are apt to be reluctant unless the new food is "represented to them in advance as an expensive or especially delicious thing."

What we eat and how we eat it are largely determined by our eating experiences. In other words, we learn to eat certain foods and to enjoy eating or to relish our food under certain conditions and at certain times.

Food prejudices are often merely a form of resistance to the unfamiliar, the strange. This may be because primitive man learned through experience that it was unwise to sample the unfamiliar fruits or berries, that the familiar and tried were both satisfying and safe. Be that as it may, the young child is often unwilling to taste new foods or old foods cooked in new ways. When the habitual diet has been limited to a few articles, food prejudices are apt to occur. One of the most important factors in preventing the development of food prejudices is provided for the child by means of a varied diet. Thus is established the habit of eating many different foods and of tasting new foods.

By trial and error the race has worked out a diet list. This racial diet has been fairly adequate; otherwise how could mankind have persisted until today, multiplying wants and means for satisfying them?

Taboo has played a large part in establishing food prejudices; religious custom has forbidden the use of certain foods. By the same means, certain food preferences and acceptances have been built up. In short, custom or habit plays a tremendous part in determining what we shall eat, how we shall eat it, how much, and when.

The advantages of a catholic taste in food are obvious, for the comfort of the eater, the cook, and the table companions. No longer is it considered "nice" or delicate to be finical about foods. Understanding of the body's need for many different

food elements has encouraged the development of a wider range of habitually used foods. Interest in new things and search for variety have been furthered by improved transportation and storage.

The twentieth century has so speeded up life and increased its complexity that greater demands are made not only upon bodily energy and endurance but also upon nervous stability. Consequently increasing emphasis has been necessarily placed upon the quality of the fuel which will generate the required energy. Increasing knowledge of the consequences of a diet inadequate to meet these increasing demands has led to an exaggerated emphasis upon the quality and quantity of food intake, so that the average mother has been made overconscious of the importance of food.

It must be remembered that all the food in all the world is of no use unless somebody eats it and that the attitude which accompanies the eating has a great effect on the value of the food for nutrition. It is assimilation that counts in nutrition of the body. This final process depends, however, upon the determination of what should be eaten and how much and also upon the attitude of the eater toward this food.

### INNATE RESPONSES

Obviously, if the newborn infant were not supplied with certain mechanisms that are ready to function, all this complicated process of eating, digestion, and assimilation would never be started.

Suckling, swallowing, and visceral reflexes are ready to function at birth. Holt<sup>2</sup> describes the fashion in which the infant eats and emphasizes the importance of aiding his process of learning to eat. When his lips touch an object they seize hold of it and begin to suck. So when his lips touch the nipple they grasp it, the sucking fills the mouth with milk, and so the swallowing reflex is set up. The milk swallowed allays that discomfort in his mid-region which we call the "hunger pang."

Nursing responses of very young infants were studied by Ripin,<sup>3</sup> who found a great variation in the nursing responses of the newborn. She distinguishes between the "purely reflex

simple sucking movement" and sucking proper. The latter involves, in addition to the reflex sucking movement, swallowing, taking hold of the mamilla, and the needful muscular exertion. Gradually the infant learns how and when to react; even the week-old baby is clumsy at nursing.

The nursing reflexes at birth may be feeble enough so that any unusual difficulty may interfere with their establishment.<sup>4</sup> The milk may be so abundant that it flows too easily to provide sufficient stimulus to establish the sucking reflex. A nipple that is difficult to seize, on the other hand, does not furnish the proper kind of stimulus but tends to discourage the baby. Thompson believes that the part any such mechanical difficulty plays in questions of feeding is apt to escape notice. In such case the treatment is aimed at the consequence rather than at the true cause.

Feeding reactions of the newborn<sup>5</sup> are called forth "only by direct contact in the region of the cheek and mouth." The nursing situation involves as significant factors "the peculiar nursing posture, the movement which initiates it, and the physical contact with the mother."

Because the esophageal sphincter is not well developed, food may pass in either direction with comparative ease. Vomiting in young children occurs with the greatest readiness; consequently regurgitation becomes a ready tool, for the mother is apt to attach undue significance to it and interpret its occurrence as food refusal.

#### LEARNING AS A FACTOR IN NUTRITION

The hunger pang is due to contraction of the stomach walls. A very small amount of food is sufficient to allay this discomfort, but the hunger pang alone could never initiate the business of eating. As Mursell<sup>6</sup> suggests, this connection between the hunger pang and suckling must be learned. Anything that gets into the baby's mouth (either by his own effort or by accident) is swallowed. By experience he learns that the hunger pang stops when he swallows, that after he has suckled he is comfortable. So this connection between "the two sets of reaction is the earliest acquisition of the infant and the most important for survival."

While the hunger pang is due to rhythmic contraction of the stomach, the "feeling of emptiness" is an inference drawn from experience. Appetite—the desire for food—is related to sensations of taste and smell, pleasant enough to call for repetition.<sup>7</sup>

After the baby has learned that a little suckling is sufficient to stop the discomfort, he must further learn to consume enough food to satisfy body needs. In other words, he must acquire the habit of the full stomach. This is a difficult process, and many feeding problems are due to failure to learn this additional matter. Although hunger may initiate the process of eating, the continuation depends upon learning.

That hunger is not simply a "local function of a local organ" but involves the entire organism is shown by the work of Wada.<sup>8</sup> Although it is impossible voluntarily to control hunger, since emotional stimuli do affect the autonomic nervous system, it is possible to establish conditioned responses. Wada goes on to say,<sup>9</sup> "Especially in early childhood, educators find opportunities to direct the habit formation of infants according to the law of hunger and its periodicity, the law of sleep and activity periods in relation to hunger, instead of according to tradition and haphazard ways."

The establishment of a rhythm of hunger is aided by appetite. Desire for food—appetite—is built up of sensations of taste and smell, temperature, texture of food, of general body tone, of memories of pleasant food experiences. The extent to which appetite is dependent upon pleasant experiences is indicated by the falling off of appetite as a result of unpleasant ones. The "healthy" appetite is an important aid in mastery of the eating process.

When we say we are hungry we usually mean we have a desire for food. Although appetite and hunger pang come to be closely associated through experience, they are not identical. Fear, anger, or excitement may take away the appetite, although stomach contractions persist. The child who is to go on a picnic "can't eat any breakfast." Appetite may persist even after the stomach is filled. The retired farmer continues to have a big appetite. When he worked in the field he needed a large amount of hearty food to supply sufficient energy and through years of labor established a habit which persists. He is not "satisfied" unless he has had the usual quantity of food.

Another factor is that of taste. Smell plays a large part in taste, of course. As compared with the adult, the distribution of taste buds over the surface of the mouth cavity of the newborn is very extensive, being especially numerous on the tip of the tongue. During the period of nursing, the tip of the baby's tongue is particularly sensitive to sweet stimuli. The area inside the cheeks is well provided with taste buds in the little child but not in adults. Titchener suggested that this accounts for the child's desire to take large mouthfuls, since by so doing he gets maximum taste sensations.<sup>10</sup>

Here again learning functions; the Mexican enjoys his highly seasoned foods; the *gourmet* prefers his game "high"; and so on. Peterson and Rainey found that sensitivity of the taste buds is acute in the little baby. Since repetition of pleasant experiences is welcomed, it is important in teaching a child to eat to make sure that his taste experiences are pleasurable and not too intense. The jaded adult palate may need highly seasoned sauces, but the child is capable of discriminating and enjoying more delicate flavors. If flavors are kept separate, the child not only has a chance to adjust to new flavors but he also derives pleasure from the more varied gustatory and olfactory experiences.

Appetite is also influenced by the setting in which eating takes place. The individual becomes increasingly dependent upon such external factors as linen, flowers, silver, and so on. In the little child an essential element of the total situation is the person who feeds him. Mrs. Moore<sup>11</sup> says of her son that "by the thirty-eighth week the satisfaction of hunger had become so closely associated with his mother that, although nourished better by artificial food, he refused it from her hand, while he accepted it readily from his father if his mother were not in sight."

In establishing serviceable food habits these factors—suckling and swallowing reflexes, hunger, appetite, taste—must all be integrated. Each must play its part in making sure that the child will eat what his body needs and that in sufficient quantity.

### THIRST

Children are much more apt to pay no attention to hunger pangs than they are to ignore thirst. Although both sensations

are local rather than general, the fact that thirst is referred to the lining of the mouth and pharynx gives an immediacy to throat sensations that will not be denied. This signal that the body is in need of water is so urgent that the child demands relief.<sup>12</sup> It may be that this difference is in part due to the fact that from earliest infancy the satisfaction of hunger, and consequently the allaying of hunger pangs, comes at regular intervals, while need for water is satisfied as soon as felt.

Rates of increase of water intake and body weight in albino rats have been found to be independent: "Body weight increases much more rapidly than water intake." There is, however, an almost perfect correlation between water intake and body surface. The daily water intake is approximately 800 cubic centimeters per square meter of body surface. This ratio applied to man yields a volume regarded as the average intake of a normal adult, that is, 1,500 cubic centimeters.<sup>13</sup>

#### APPETITE AND AMOUNT EATEN

In studying the relation between appetite and energy Cowgill<sup>14</sup> experimented with dogs. On a complete diet a dog eats all the food offered and gains in weight until he reaches a certain maximum. After that he eats only enough to maintain body weight.

While it is important to make sure that the child should eat enough to supply his body needs—for growth, maintenance, and the overflowing energy that is of the essence of childhood—it is also important to guard against overeating. There is danger of overeating as well as of undereating. Oftentimes parents labor under the false impression that the more a child eats the faster he will grow and the stronger he will be, and consequently they urge a child to eat beyond his need. The "clean plate" thus may do harm. It is better occasionally to run the risk of undereating than to urge food upon a child who has had enough or who for the moment has no appetite. By so doing it is possible to set up food dislikes and even antipathies that may interfere with normal, happy eating. To appreciate the truth of this remark the adult need think only of his discomfort if circumstances force him to eat when he lacks appetite.

Student of David Katz found that a hen will eat more when a large heap of grain is before her than when confronted with a



smaller. A fresh supply of food encourages her to continue eating, even though she has left some of a previous supply.<sup>15</sup> This behavior of hens is very similar to that of people.

### SELF-SELECTION OF FOOD

In the last few years an experiment in child feeding which is of far-reaching importance has been carried on by Dr. Clara Davis.<sup>16</sup> In order to determine whether or not little babies would be able to select the sort of food which would meet their particular needs, Dr. Davis has provided a laboratory test of the assumption that children with an unspoiled appetite are guided in the selection of their food by a desire for the food which meets their specific needs.

Breast-fed babies of six months are offered vegetables, meat, fruits both raw and cooked, sweet milk, lactic acid milk, and seisal, that is, salt which still retains the various minerals. No attempt is made to feed the children; they are allowed to select, by dipping their hands into various dishes, the foods which meet their own needs. It must always be remembered that the foods offered the child comprise a wide assortment of natural food-stuffs, carefully selected and prepared. Every effort is made to avoid giving any suggestion regarding choice. When, however, the child has indicated, perhaps by pointing, that he wishes a certain food, the nurse may offer it to him.

Gradually the children learn to feed themselves. This is accomplished by trial and error, since no effort is made to teach them. These children have astonished the observers by selecting an adequate diet; they have grown, are well nourished, and are in excellent health. Their appetites are good; they develop rather marked individual differences.

The experiment is having a wide effect upon our methods of feeding children in that it has emphasized the importance of allowing a child freedom to develop a capacity for selecting his food. It is not to be thought, however, that this laboratory method can be transferred bodily into a home situation. In the first place, these babies begin practice in the selection of food immediately upon being taken off the breast; in the second place, the entire situation is organized in order to safeguard this process of selection. By neither look, word, nor movement does the

nurse indicate approval or disapproval. While such an impersonal atmosphere is neither possible nor desirable in the home, it must be remembered that the success of the experiment depends directly upon the impersonal attitude.

The method in a modified form, however, can be used in the home and is valuable in that it reduces the emotional connotations to a minimum. By freeing the child from pressure the development of resistance on the part of the child is avoided.

In this discussion no attempt is made to consider separately or directly the physiological factors involved in the development of food habits. The relation between physiology and psychology of nutrition is so close as to necessitate frequent reference to the former.

#### NON-HUNGER IN CHILDREN

If we are correct in supposing that the healthy normal child is a hungry child, how does it come about that so few young children are hungry? Any discussion of the psychology of nutrition must attempt to answer two questions: (1) Why is the child not hungry (when all physiological factors have been eliminated)? (2) Why is the child not hungry for the things he should eat?

It would seem that a child who has had an opportunity to learn to eat, unhampered by bad teaching, would be hungry for the right kind of food in sufficient amounts at regular intervals. Instead of being the usual thing, this situation appears to be rare. Since cases of non-hunger are so common, it will not be out of place to consider how the condition arises and what can be done about it.

From the discussion of the hunger pang it is obvious that retention of food in the stomach would result in lack of hunger. A boy of three, tall but delicate in appearance, preferred quiet forms of play or even to stand and watch rather than to participate. Meal time was a time of discomfort for everyone in the household, for he was never hungry. Finally at the recommendation of his physician he was put on a fat-free diet. Immediately his condition altered. He was like another child, hungry, alert, full of energy, eager to attempt new things. According to the physician, his stomach, as a result of the slow digestion of fat,

had never been empty—consequently he simply could not be hungry. Not being hungry he did not eat enough food to produce an adequate amount of energy.

A further complication here was due to the tremendous desire on the part of the parents that this child should develop in such a way as to fulfill their ideal. The father wanted him to be hail fellow, well met, a fighter and a regular boy. The mother did everything in her power to develop an artist. In spite of the strain due to the conflicting ambitions, the boy now eats and is developing into a well and wholesome youngster. The moral of this is that when the alimentary tract functions normally, the stresses of everyday living are endured with greater equanimity.

Non-hunger may, however, be increased by emotional strain or excitement. When the child is uncertain as to what is expected of him, when greater demands than he can fulfill are put upon him, when discipline is inconsistent so that one day he can "get away with murder" while at another time the same behavior is a crime, when he is overstimulated either by a too complicated environment or by the urging of adults—his appetite is almost certain to show the strain.

#### PSYCHOLOGICAL PREPARATION NECESSARY

If a child is to be hungry he must have a chance to get ready for the meal psychologically as well as to wash his hands and comb his hair. This psychological preparation takes more time and cannot be a hurried affair. Hurrying him from his play to the table often means that as far as his mental set is concerned, his play goes with him to the table. He cannot turn his mind to eating, because it is already occupied. Consequently the part of wisdom is to give the child time to get ready for dinner psychologically by giving him a few minutes' warning. "It is almost time to come to dinner" or, better yet, a ten-minute rest before dinner will do much to give a chance for this shift in attention to occur.

#### CHANGING HABITS

A great deal of care is given to weaning the child from the breast; he must be taught how to drink from a cup, to take food from a spoon. The wise mother begins when the baby is still

very young to teach him to drink water from a cup, to take orange juice from a spoon. Along with the habit of nursing are built up these other habits. Just as any great difficulty in extracting the milk by suckling may make it impossible for the child to nurse, so any interference with other methods of ingesting food may interrupt the process of learning to feed himself.

Nursing involves establishment of a serial response, the fixing of reflexes, coordinating them into a more complicated pattern. When increasing nutritional demands require extension of the baby's diet, these behavior patterns must be converted into a new set of habits. In this process learning plays an even more important part. A second period of changing habits comes when the child is learning to feed himself.

Teaching the child to eat solid food involves learning just as definitely as does the process of weaning. Although the presence of a liquid or a semiliquid in the mouth induces the swallowing reflex, solid food is not automatically disposed of in this way. In addition, the attempt to swallow too large pieces may result in choking. So it comes about that the child who is learning to eat solid food may hold it in his mouth without any attempt to chew it. The child, of course, has to learn that chewing will reduce the lumps to a swallowable consistency.

The method by which a child learns to chew appears to be largely one of trial and error. A solid or semisolid substance in the mouth apparently is pushed about by the tongue and lower jaw. If the teeth close on it, in such a way as to crush it, the tendency to move it about in the mouth by moving the lower jaw and by cheek movements is increased. Synchronized movements of crushing and of rotation together with tongue manipulation are found to be adequate in reducing solid substances to a swallowable consistency.

That adequate mastication, or its opposite, is a matter of habit is evident from watching any group of people at table. Gulping of large portions, washing food down with liquid make for speed of eating. A certain nervous irritability manifests itself in the seizing and hasty swallowing of food.

Little children as a part of learning to eat solid food must learn to chew and to swallow at frequent intervals to take care of the contents of the mouth. Often a little child chews rabbit fashion,

using only the front of the mouth and chopping the food with the incisors. Diminutive mouthfuls that can satisfactorily be handled in this way are both cause and effect of this method of chewing.

Increasing the size of the mouthfuls, while having its own peculiar dangers, does tend to compel the proper use of the teeth in chewing. Direct instruction by means of a command to chew, illustrated by exaggerated chewing movements, is a help. The effectiveness of trial and error is demonstrated daily in nursery schools, where at dinner a small piece of dry toast forms the child's first course. He can of course suck a corner until it fairly dissolves in his mouth, but this is a tedious way of disposing of the toast. Having by chance broken off a bit or having been shown how to bite off a piece, he discovers by accident the crushing effect of his teeth. The pleasantness of this sensation is augmented by the pleasant sound of the crushing. Gradually the child learns to chew vigorously. This is done after the ventilated fashion of the subway gum chewer—lips apart, with free use of tongue movements in pushing the food about the mouth. Occasionally the three year old may be observed to make a chewing movement with closed lips. A complimentary remark upon this achievement with an added comment to the effect that this is the adult fashion of chewing will serve to encourage mastery of this final step of the chewing process.

Although swallowing is a reflex activity, deglutition occurs also through voluntary action. In teaching a child to eat solid food it is sometimes necessary to teach him how to swallow voluntarily. Tipping his head back so that the food rests against his throat helps. Pommerenke<sup>17</sup> found that mechanical stimulation of the pillars of fauces, particularly the anterior, more easily produced the swallowing reflex than stimulation of any other region of the pharynx.

Serious interference with the process of learning to eat solid food may result from prolonged use of the nursing bottle. Reflex activities are overlaid by habit. The process called conditioning is the means by which this takes place. The suckling reflex becomes conditioned to the bottle, but gradually this conditioning is broken down through the process called weaning. If, however, weaning is postponed beyond the age at which the physical equip-

ment for taking of semisolid food is developed, the foundation for learning to eat solid food is not laid. The process from suckling to solid food is a continuous one, no step of which can safely be omitted.

### FEEDING HIMSELF

The business of feeding himself is hard work for the child. To "insert portions of the outer world" into that small opening called a mouth is no slight task and requires a high degree of motor control. The little child often opens his mouth to its widest in order to insure safe entry. Accuracy of aim and the muscular effort of lifting a spoon again and again are considerable strain. As a result the child may stop eating before he has had enough food to supply his body needs. To strike a balance between giving just enough help to relieve fatigue and to encourage effort and not too much help is here, as always, a delicate matter.

While sufficient motor control to secure some accuracy of aim is being developed, the child's interest holds. After the process has been mastered he may lose interest. It frequently happens that the child who is just learning to feed himself is more successful as far as table manners are concerned than the child who has developed the necessary skill and consequently lost interest in the process. Then the mother complains, "I'm ashamed of Jennie's table manners, she doesn't eat so well as she used to do."

What really has happened is that the process is not yet sufficiently automatized to be carried on without the attention being focused on it and yet has been well enough mastered to have lost its interest as an adventure.

### INTRODUCTION OF NEW FOODS

Not only must the child learn to eat foods of all degrees of consistency varying from liquid to solid; he must also learn to eat foods of varying flavors. Apparently the child through experiencing various flavors learns to enjoy them or at least to tolerate them. Sudden stimuli are disturbing to the child; intense and unfamiliar stimuli also appear to be unpleasant. Consequently his introduction to new foods needs to be carefully handled.

It is important therefore to make an effort to teach a child to enjoy various flavors. Gustatory sensations coupled with olfac-

tory may be a source of pleasure or of discomfort. It is essential that unpleasant sensory experiences be avoided, lest the child transfer his reaction against the unpleasant sensations to the food and so refuse it or develop what is called a food dislike.

### FOOD REFUSALS

The principle of maintaining pleasant associations with the process of eating is an important one. So easily may discomfort and unpleasantness be transferred from their actual cause to the process of eating that every care should be exercised to make the dining room and meal time pleasurable. The principle that learning is interfered with whenever a desired response is eliminated through pain holds true in the dining room just as surely as on the playground. We expect this principle to function when we wish to cause a child to stop doing something we regard as undesirable, but we ignore it when we do not wish to use it as an ally.

The factors that underlie a refusal of certain foods are many and varied. Food refusals play a large part in making the modern home an uncomfortable place, at least at meal-time. Many of the factors that tend to produce non-hunger or absence of appetite underlie the refusal of a certain food. Very early in life the child learns to use this weapon as a means for managing his family or for emphasizing his own importance. Fortunately food dislike is ceasing to be regarded as a patent of nobility. Over-solicitation and urging on the part of parent or nurse tend to fix into a habitual attitude what might have been merely a temporary matter.

Negative conditioning explains many a food dislike. The child who eats honey until he is nauseated develops a dislike for honey that may persist. The unpleasantness of the nausea is transferred to the food. Such negative conditioning may break down through desire. It may also be overcome by negative adaptation.

As Aldrich has suggested, forcing a child to eat when he has no appetite is a most effective means for developing food refusal. In the light of what we know about learning why should any other result be expected?

Genuine food refusals may be developed because of either accidental or deliberate regurgitation. The unpleasantness and

also the extreme discomfort which the adult finds in vomiting lend to regurgitation an importance which is fictitious. The child being quick to sense the attitude of the adult learns to use this as a weapon.

A boy of three was so expert in regurgitation that he could practice it at will. By this means he managed his meals to suit himself. When he first came to the nursery school he proceeded to use the same method that had been effective at home. He was placed at a table by himself in the children's dining room, but this did not prove to be sufficient isolation. Then his table was moved into a room where he had to eat alone. Here no attention was paid to his vomiting. A fresh portion of the same food was served without even giving him a clean tablecloth. Within a week he had dropped this method which had proved to be ineffective and was eating everything served to him. Finally he was allowed to return to the children's dining room. His mother was cooperative and by using the same method at home finally cured him of this bad habit.

Introduction to a new food should be managed as tactfully and with as great care as possible in order to give the child a chance to appreciate its flavor. The little child's tendency to withdraw from unexpected and strange stimuli causes apparent food refusals. The refusal, however, has little or nothing to do with the particular article of food. If the adult who presents it is unwise in insisting that it be eaten or calls too much attention to its newness, a persistent aversion may be developed. Color and consistency, as well as flavor, are important elements of the total sensory experience. If the child's first experience with a new food leads to a negative conditioning, great time and labor may be involved in reconditioning him and in building up the desired response as a substitute.

#### LEARNING IN RELATION TO EATING

That wide variety of undesirable behavior which is covered by the term "dawdling" comes about through failure to build up a serial reaction in eating. The delay comes only seldom by way of too complete mastication. For the most part it lies in pauses between mouthfuls or in holding food in the mouth or through too much conversation or playing with the utensils. Prevention



and remedy both are found through development of a movement system which carries the child straight through a meal. A concept of the lapse of time may also be established. In the case of younger children, the business of feeding themselves may tax their energy so that they need for the time being to be relieved of part of the responsibility for feeding themselves.

Fortunately the appetite can be trained. The methods of learning discussed in Chapter III function here. To recognize that the development of appetite comes partly as the result of learning is to make a great stride in the solution of many a feeding problem. Such deliberate application of the laws of learning in the business of teaching children to eat accounts for the progress of "eating problems" when they come to the school.

It is a common experience to find that good habits do not hold in a new situation. Even though a habit functions perfectly at home it may not function at all in a strange place. This is so because the habit has been learned as part of a total situation but has not become sufficiently automatic to function under conditions which differ in some respect from the original. This holds true also for bad habits. Consequently the bad eating habits already established may not function perfectly in the nursery school. This gives the school an opportunity to build up the desired habit. This particularization of habit accounts also in part for the failure of the new habits to function at home.

The failure of reported bad eating habits to manifest themselves in school and the comparative ease with which those that show themselves are broken down are surprising. Two brothers, J. and H., were sent to the school because of the mother's alarm over their failure to eat. Contrary to expectations, they demanded second servings and in no time were eating adult portions. So it was with S., who had something of a reputation for leisurely eating. Very quickly he grasped the idea that dawdling was not socially acceptable and shortly was taking great pride in eating at the proper speed: "Nobody did have to feed me!"

Occasionally with two year olds, what are supposed to be bad habits or refusals to eat are due to the child's not knowing how to eat. J. B., for example, appeared to require an endless time to drink her milk. What really was happening was that she, having

been allowed up to that age to take her milk from her bottle, did not know how to drink from a glass. She clamped her teeth against it and, of course, had no luck in drawing the milk into her mouth. After being shown how to set her lips but not her teeth against the glass, she quickly learned to drink. It is an interesting but baffling fact that a child who has been permitted to take milk from a bottle after the usual age of weaning may refuse to drink milk, although he willingly drinks orange juice from the same sort of cup or glass.

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## CHAPTER XIV

### LEARNING TO SLEEP

The importance of activity—interaction between organism and environment—as the foundation of learning is paralleled by the importance of rest and sleep, which provide in part for the replacement of worn-out tissues—recuperation—and for increase in amount of tissue—growth. Sleep is important not only in the maintenance of bodily vigor and growth but also in preserving the child's alertness and peaceableness.

The alternation of rest and activity is the foundation principle on which rests the maintenance of efficiency. The amount of sleep a child requires decreases with age until the child reaches maturity. That the growing child needs more sleep than the adult is taken for granted by everyone except the child himself. As development proceeds, the rhythm of sleeping and waking adapts itself to the needs of the individual, as determined by his experiences and by his own constitution.

The newborn infant spends most of his time in sleeping. Pratt, who worked in the psychological laboratory of The Ohio State University, found that during the first two weeks after birth infants are awake 28 per cent of the time and sleep 72 per cent of the time.<sup>1</sup> Except for changes in temperature, the child is but little disturbed by his environment. Hunger, pain, internal sources of discomfort, serve to waken him. Sleeping periods during the first year of life are, according to Bühler,<sup>2</sup> very short. Increased duration of uninterrupted sleep is accompanied by "a limitation of the number of sleeping periods."

At the age of about four months the preferred sleeping position changes from that of the embryo with fists near the head, the knees stretched to some extent, and the soles of the feet approximated to lying on the side or prone. The newborn baby twitches at the moment of falling asleep, the child of two months "often turns his head sideward when he falls asleep, and the four- or

five-months-old child makes a sideward movement with his whole body."<sup>3</sup>

The postures preferred by children in a nursery school were observed by Boynton and Goodenough,<sup>4</sup> who report the following rank order: right side, left side, abdomen, back. "Children whose postural habits during sleep are most uniform" are apt to fall asleep more quickly than those whose habits vary from time to time. Two other conclusions which these authors draw are (1) that changes in posture of the entire body occur more frequently than any single partial change and (2) that during the early stages of sleep, movements are least frequent.

As the child becomes more and more sensitive to the stimuli arising from his environment the amount of time he spends in sleep is gradually diminishing. The hours of sleep are redistributed. The newborn child's sleep is punctuated by brief intervals of waking. Little by little these intervals are lengthened until, in the two year old, sleep becomes gathered into three sections—morning and afternoon nap and night-time sleep. A child under two should sleep as long as he is so inclined, for it is during this period that he establishes good habits of sleep. Day and night sleep form a single rhythm. Between the ages of three and four the child's sleep begins to show the adult type of rhythm. Too long an afternoon nap, by satisfying too large an amount of the sleep need, may interfere with the sleep at night. This interference is most apt to show itself in difficulty in getting to sleep at night. Consequently the child should be awakened after he has had an hour and a half or two hours of sleep in the afternoon in order that he may be ready to fall asleep when bedtime comes. Although it always seems a pity to waken a child who is sound asleep, it may be necessary to do so in order to preserve the rhythm of sleep and waking.

Parents of three- and four-year-old children who are accustomed to a nap at nursery school oftentimes complain of the difficulty of getting these children to sleep at night after the afternoon nap. They say that on Saturday and Sunday, when the child plays quietly instead of lying down, he goes to sleep in the evening with no difficulty at all. Children at this age need to rest even though they may not fall asleep, lest they become altogether too fatigued by night-time. Restoration of vigor

occurs during rest. It is possible to teach them to lie quietly and so to rest if no insistence is placed on going to sleep. Even though the child may not fall asleep, the additional rest that he needs should come at regular intervals.

The decrease in total amount of sleep which comes with increasing age occurs in daytime rather than in night-time sleep. The child who is outgrowing the need of a nap does so not by gradually decreasing the length but by omitting the nap altogether. During the latter part of the preschool period when the habit of daytime sleep is beginning to break up, the older children are apt to be much more difficult to manage in the nap room. On some days the child takes no nap at all, while on others he sleeps soundly. The studies made at the St. George's School of Child Study, Toronto, and at the University of Minnesota indicate that this shifting in length takes place on the all-or-none principle; that is, the child naps or does not nap. Gradual reduction of the length of the nap does not occur.

The individual variation in the total amount of sleep needed is great; the criterion of adequate sleep lies in the child's bodily vigor and in his poise. For the most part, the statements regarding necessary amounts of sleep have been built up on the basis of estimates. There are several studies which base their conclusion on the reports made by nursery school teachers and by parents. The following table gives the results obtained for the total

TOTAL SLEEP OF CHILDREN AT DIFFERENT AGES<sup>5</sup>

Age	Average amount taken		Greatest amount taken among 25 per cent of children having least sleep	
	Hours	Minutes	Hours	Minutes
Before one year.....	14	45	13	54
One year.....	13	14	12	39
Two years.....	12	43	12	11
Three years.....	12	07	11	37
Four years.....	11	43	11	13
Five years.....	11	18	10	51
Six years.....	11	04	10	40
Seven years.....	10	58	10	34

amount of sleep within a twenty-four-hour period by the Institute of Child Welfare of the University of Minnesota, irrespective of season. In the winter the average is fifteen minutes more, while in the summer it is fifteen minutes less. Between the ages of one and seven years, children sleep about eleven hours a night.

A study made at the Washington Child Research Center indicated only slight differences in the average time of going to bed, falling asleep, and awaking for children of two, three, and four years. It took the two year olds slightly longer to fall asleep. The later children are put to bed the longer it takes them to go to sleep and the later they awake in the morning, while the total time asleep is shorter.<sup>6</sup>

Studying two groups of children, one Hawaiian, the other American, Shinn finds that the median time of going to sleep at nap time varies but little with age during the preschool period. Frequency of nap decreases with fair regularity with age, as does median length of sleep at night. A long sleep period one day is followed by a shorter one the next.<sup>7</sup>

The baby's sleep habits have profited by the lengthening of intervals between feedings. Experience has proved that even a young baby can sleep the night through. The earlier a child forms the habit of uninterrupted sleep at night the better for him and for his parents or nurse.

Another wholesome habit which should be held inviolate is that of early bedtime. Times of falling asleep and duration of sleep are largely matters of habit. It is therefore necessary that care be devoted to the building up and maintenance of good habits.

Daylight saving time has been so commonly blamed for disturbed or diminished sleep that a study was undertaken to find out what the changes actually are.<sup>8</sup> In order that all other conditions might be constant, the study was made in an institution which cares for orphaned children. These children were of nursery school age and slept in a dormitory. The sleep records justify the conclusion that when all other factors are constant, the total sleep is not affected by the change to daylight saving time.

While, as a rule, the baby sleeps spontaneously, there is occasionally a child who may be described as a poor sleeper. Such

children are sometimes the victims of the treatment they have received. Every visitor in the household is so eager to see the baby that it takes a great deal of self-control and diplomacy on the part of the mother if the baby is to be protected from disturbance. When once the continuity of the infant's sleep has been shattered by disturbances of any sort he may become sensitive to slight stimuli from the environment. Sleep is very largely affected by habit, and habit begins to affect sleep from the first day after birth.

The baby is normally but little disturbed by the world outside himself, but the older child must "achieve sleep." As the child's ability to recognize and interpret what is going on in the world about him increases he becomes more and more apt to pay attention to these sights and sounds.<sup>9</sup> The complete relaxation which results in immobility comes much more readily when the outside world is shut away. The child may be taught to lie quietly with his eyes shut and thus learn to rest.

Outdoor play is an excellent preface to sleep because the child who is wholesomely fatigued is ready to relax and to lie quietly. While most young children fall asleep more readily if their eyes are closed, some children go to sleep more quickly if they keep their eyes open. Occasionally a child drops off more quickly if he puts his hands over his eyes. The injunction "go to sleep" is less effective than some such direction as "shut your eyes" or "have a good rest."

In training the child to sleep, the first thing to do is to give him a chance. A comfortable bed in a quiet room and solitude are the chief prerequisites. If a child is wakeful, it is easy for the adult to become anxious. Knowing that he needs rest and sleep and fearing the ill effects of fatigue, the adult who is responsible becomes concerned about him. The little child is amazingly subtle in grasping this stress in attitude; his involuntary response is an increased wakefulness.

The importance of safeguarding the child's sleep from interruption, the necessity of insuring regularity of sleep periods cannot be overemphasized. One of the disadvantages of small houses is that the child uses the same room for sleep and for play. Every effort must be made to help the child to realize that sleep is expected at certain times and under certain conditions. It is

obvious that interference with the child's routine or any disturbance of his health may interfere with his sleep habits. Serviceable sleep habits need not only to be established but also to be preserved.

Even when very young, the child becomes conditioned to particular factors in the total situation. A little girl of three was quite unable to go to sleep at the nursery school. She made every movement possible within the limitations of a cot. Everything that went on in the nap room received a due measure of attention from her. At first it was thought that the difficulty lay in the necessity of establishing a new sleep habit in a new situation. When her mother was consulted, however, it was discovered that from earliest babyhood the child had gone to sleep hugging a woolly animal. This plaything had become so potent a stimulus for sleep that lacking it the child was quite unable to fall asleep. It is difficult to determine exactly what the essential conditioning factor may be.

To establish a conditioned response to a particular blanket or toy means that that precise object is essential to sleep. While, for the time being, there may be an apparent aid, due to the fact that the child will lie more quietly if he has something in his arms, it is a mistake to build up any such conditioned response, since the time will inevitably come when that particular factor is not available. On general principles it is unwise to develop dependence upon any one thing.

Not only may a child become positively conditioned to some particular accompaniment to sleep so that without it sleep is impossible, but that child may also become negatively conditioned so that when in a certain situation he tends to keep awake. This refers not only to disturbing factors such as unusual noises, odors, or movements but also to habits of responding to extraneous elements in the situation. Although the situation may be identical, except for these additional given items, it is these elements which are crucial.

The child may become so perfectly habituated to a particular sleeping situation that he is quite unable to fall asleep in a new situation. Having become positively adapted to that situation he is dependent upon it for sleep. The sleeplessness and the difficulty little children have in going to sleep when they are



visiting are due not only to the excitement and fatigue which inevitably accompany visiting but in large part also to the absence of the conditioning stimuli. Obviously any individual during his lifetime may be required to sleep in many places. Serviceable sleep habits involve the avoidance of too high a degree of habituation to a single sleep situation. The habit of falling asleep should be attached to the stimulus of relaxing in bed, rather than to a definite sleeping situation.

Extraneous or irrelevant stimuli assume importance through positive adaptation. Just as one child demands his pet blanket, another may insist on a light. Fear gives an apparent justification for a practice which actually owes much of its persistence to this process of positive adaptation.

An eight-year-old girl lay in a narrow bed with two large dolls, a stuffed rabbit, and a teddy bear—a doll and a stuffed animal on either side of her. So completely occupied was the bed that she could not turn over without lying on one or another of her playthings. Her movements were so hampered that restful sleep appeared impossible.

The wearier the child is the harder it may be for him to go to sleep. Just before bedtime he is more tired than at any other period of the day. Consequently small events prove more exciting than they would have been earlier. Because it is difficult for the exhausted child to relax, he cannot lie quietly but is curled up into a ball or twisted into a knot, or muscles may twitch and jerk. The wearier he is the more vigorously he may protest against bedtime. Unwillingness to go to bed is, in part, an expression of reluctance to risk the loss of interesting or pleasant experiences which the older members of the family will share.

The direct pursuit of sleep is seldom successful and less than ever when the child is excited or overfatigued. The training of sleep habits which will be of greatest value to the child throughout his life is the development of a capacity for relaxation. With the adult this relaxation may come as a therapeutic measure, as, for example, in Jacobson's technique,<sup>10</sup> which induces muscular relaxation by means of kinaesthetic imagery.

With a little child this quietness comes through the suggestion given by the posture and voice of the adult. Patting or rubbing the child seems to be of little help, nor is it advisable in the long

run, even if it be of temporary assistance. So simple a thing as turning over a child who has been lying in bed a long time without going to sleep may bring about the necessary relaxation. If the muscles are tense, a gentle rhythmic shaking of arms and legs will bring about that lessened control which is the forerunner of sleep.

Preparation for sleep is all too often neglected. As the child grows older there is need for psychological preparation for bed. Excitement, vigorous play, and the suggestion of interesting events to be forthcoming in the morning are, of course, to be avoided. The child needs also to be surrounded by an attitude of leisureliness—a letting down of the day's tension. In the average home this is by no means easy to achieve.

Retraining a child who has formed bad sleep habits requires not only poise on the part of the adult but a high degree of skill. Even the settling of a normal child to sleep is no easy thing. J. Mark Baldwin says of his daughter, "I, myself, learned during the fourth month to put her to sleep and learned with great difficulty though pursuing the nurse's method as nearly as possible. Here, therefore, was a sleep suggestion from the personality of the nurse—her peculiar voice, touch, etc."<sup>11</sup>

Sending children to bed as punishment not only breaks up sleep habits but develops unfortunate associations—bed and bedtime cease to be devoted to sleep and may become related to all sorts of unpleasant things.

Such habits as rocking the head, sucking of fingers or thumb, masturbation, and bed wetting seriously interfere with sleep. Since a consideration of these bad habits occurs elsewhere, it is necessary only to call attention to the fact that the first three are apt to develop in wakeful children and are the accompaniment of poor sleep habits.

Because the dependence of sleep upon learning is so great, the importance of early training which leads to the establishing of sound habits cannot be too much emphasized.

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## CHAPTER XV

### ELIMINATION

The development of voluntary control over the sphincters involves both maturation and learning. In earliest infancy, evacuation of bladder and bowel is automatic. Elimination easily becomes conditioned so that it takes place readily in a customary situation. Finally, elimination becomes subject to conscious control.

Training takes very largely the form of providing opportunity for the development of conditioned responses and the arrangement of incentives for conscious control. The significance of conditioning factors, whether they be selected by the person who is responsible for the control or merely incidental, should be recognized from the outset of training. Perhaps in no aspect of child development is the function of the total situation of greater moment. Because of the association of the sphincters, both physiologically and ideationally, with the external genitals the establishment of socially desirable toilet habits assumes an almost fictitious importance.

Evacuation of bladder and bowel gives rise to definite sensations which for the most part are ignored by the adult but for the young child constitute an experience. With increasing control of the sphincters, training in regular habits progresses. Trainability, however, is a two-sided affair; it is both psychological and physiological. Acceptance of training, the effectiveness of training depend upon the constitutional make-up of the child. Differences in anatomical structure of the viscera, completeness of assimilation, the effectiveness of digestion—these and other factors are involved in the readiness with which training is appropriated.

Periodicity of elimination may be established during the first months after birth, but responsibility for conscious control is beyond the child's capacity until he is about four years old. This

is not to say that it would be unfair to expect the child to make his needs known and to be able to care for himself at the toilet at an earlier age but rather that the final responsibility for bearing in mind the child's needs and seeing that he makes the necessary trips to the toilet belongs to the adult.

Control of the organs of elimination, according to Blatz,<sup>1</sup> must cope with (1) the persistent function of secretion, (2) a social environment which demands observance of the proprieties, and (3) the difficulty of differentiating the factors involved in this intra-organic phenomenon. The purpose of training is not avoidance of wet clothes or an empty bladder but rather recognition of fullness of the bladder and the development of muscular control which enables the child to refrain from urination until he can reach the proper place to perform the function satisfactorily or make his need known. One of the essential factors in training the child for the toilet is the process of conditioning which insures evacuation only in the proper place.

Sometimes in training a child the mother's mind is so set upon the importance of avoiding wet or soiled clothing that the child is taken to the toilet so often that any distension of the bladder is a stimulus for urination. The child, however, must be trained for continence as well as for evacuation. It is sometimes surprising to discover the capacity for retention of urine possessed by a child who has established a habit of too frequent urination. C., at the age of three, proceeded to wet his clothes whenever he felt so inclined and seemed quite unable to recognize the need of making an effort toward the retention of urine. One day, however, when traveling by automobile with his mother he was told that there would be no chance to go to the toilet until he reached home. Contrary to all expectations he arrived at the end of the four-hour drive with dry clothes and, of course, with a feeling of great pride in his control. While this proceeding is not at all to be commended, necessity in this case revealed a quite unsuspected capacity for control.

When the bladder is to be emptied two motor processes go on simultaneously, the muscular walls are contracted in order to expel the contents of the bladder, and at the same time the sphincter is relaxed to permit the expelling of urine. At the end of the act of elimination this process is, so to speak, reversed

in that the sphincter is closed and the bladder relaxed. The alternate control and relaxation of muscles involved in elimination functions automatically during the early life of the child. In the process of acquiring the voluntary control, training must wait upon maturation. Not until the child is about four are the nerve fibers involved sufficiently developed to insure complete control. It is obvious, therefore, that training must not proceed at a greater rate than the growth of the nervous system warrants. Further proof of this is found in the fact that in subnormal children delayed control is common. Persistence of involuntary bowel movements and micturition may be symptoms of mental defect.

Holt says that breast-fed infants will have from two to four stools a day during the first few weeks, while after the first two months two stools a day are the average. In the tiny baby urination may occur as often as two or three times an hour during the waking hours and, during sleep, at varying intervals from two to six hours. By the time the baby is a year old the bladder empties at intervals of thirty to forty-five minutes. At night the interval may vary in length from a few minutes to as much as three hours. When the child is eighteen months old he should be reliable in the daytime if his life is running smoothly. At two years his reliability should be almost invariable during the day, and he should begin to have dry nights. Between the ages of two and a half and three years he should be able to go eight or nine hours at night without urinating.<sup>1a</sup>

The committee on the infant and preschool child of the White House Conference found that in 99.1 per cent of the four-year-old children studied, bowel control was established, and bladder control in 97.1 per cent. Only 9.7 per cent of the boys over two and 4 per cent of the girls lacked bowel control. Of the boys over two, 19.4 per cent lacked bladder control, and 9.6 per cent of the girls.<sup>2</sup>

While the importance of regularity of elimination cannot be too greatly emphasized it must also be recognized that changes in the child's routine will almost invariably affect the regularity of eliminations. The child's physiological rhythm is sufficiently constant, however, to make it possible for the mother or nurse to forestall the soiling or wetting of diapers. Contact with the

toilet seat or vessel and the characteristic position quickly come to act as stimuli for evacuation.

In the beginning or during these preliminary steps, all responsibility for regularity and for the avoidance of soiled or wet clothing is assumed by mother or nurse. The baby who is permitted to become negatively adapted to soiled or wet clothing is much more difficult to train for the toilet, while the child who is so accustomed to dry clothing that any other condition is surprising by virtue of its novelty has taken one of the first steps toward good toilet habits.

The one rule of toilet training is a simple one, namely, to observe the natural rhythm of elimination and to put the child upon the toilet at such intervals as shall forestall accidental urination or defecation. Gradually the intervals are lengthened, thereby building up in the child a capacity for retention of urine and for voluntary elimination.

There is evidence that too early a beginning of definite teaching may make an excessive demand on the child's capacity for control, interfering with the very end desired. Consequently it would seem wiser to postpone direct toilet training until the child is old enough to understand what is wanted of him.

While premature training is harmful it is also unwise to begin training too late, for the child forms the habit of urinating regardless of circumstances. If, however, training is begun too early, the inability of the child to respond may result in irritation and impatience on the part of the mother which directly interferes with the training process. While a feeling of responsibility with regard to his own behavior should be developed in the child, it must be remembered that responsibility waits on capacity. Undue interest in elimination may have its root in premature emphasis on regularity and cleanliness. In order to insure wholesome and serviceable habits of elimination the child's stage of maturity and the relationship of those habits to general well-being must be considered.

The process of conditioning and regularity of elimination during the early months lay a foundation upon which training can build. Even when control has been established to a degree which enables it to function perfectly under ordinary conditions, that is, under the conditions which prevail during the period of

learning, that control may break down when subjected to unaccustomed situations. A child who has been perfectly trained in one situation may not be reliable when he is put into a new set of circumstances. The interruption of toilet training which occurs after visits is due to the fact that a functioning which was conditioned in one situation did not occur when the elements were altered. Regularity of bowel movement is apt to be disturbed as a result of traveling about. This tendency to constipation is often laid at the door of changes of food and water. As a matter of fact, the interruption of conditioned response by change in the stimuli may be the cause.

Teaching a child to control urination, that is, toilet training, is a one-person job and should be carried on under constant conditions. For this reason it is inadvisable to admit a child into a nursery school until his toilet habits are thoroughly established. Even then accidental urination or even defecation may occur during the early weeks at nursery school.

Since the familiar stimuli are so potent in producing the desired result it is better to begin the toilet training by putting a small seat upon the toilet stool rather than by use of a nursery chair. Instances of children who refuse to urinate or who find it impossible to have a bowel movement when the nursery chair is outgrown are frequent enough to justify the conclusion that an unnecessary step in the learning process is introduced by the use of a nursery chair.

When these habits have been perfectly enough established to insure regularity and control, then they may be more readily set up under conditions which are in part new. This extension does, however, require teaching and involves a new learning on the part of the child.

Until this development is achieved, accidental elimination may be anticipated, but the actual control lies in the hands of the adult. It seems unfair to put responsibility upon children prematurely. It is much wiser to invite the child to go to the toilet, allowing him the privilege of refusing until he is completely reliable. Breckenridge, working at Merrill-Palmer, found a direct relationship between both chronological and mental age and reliability. She also discovered that those children who were unreliable had been more subject to disease than the reliable ones.



Control involves both a perception of the need for elimination and also the ability to restrain evacuation until the child can arrive at the proper situation. Even after such control has been established the child is still unready to assume full responsibility. Absorption in his play may cause him to pay no attention to the warning sensation until the sphincters have relaxed and evacuation taken place. One three-year-old child would burst into tears on occasion and protest that she had no need of going to the toilet. This outburst was usually an indication that her clothes were already wet. The usual means of encouraging prompt attention to warning sensations, such as the expression of disapproval, the accidental discipline due to the fact that the child had no dry clothes and therefore must sit in a blanket until all clothes dried, had no effect. Then the plan was tried of paying the least possible attention to her difficulty, the only notice taken being that of helping her to get herself out of her wet clothes and into dry ones. This plan removed all pressure and aided in reducing the importance of wet clothes. Finally the conclusion was reached that her interest in her play was so great that the first indication she perceived of her need to urinate was either the stream of urine or the wetness of clothes. Surprise, chagrin, and realization of the disapproval such behavior would meet at home combined to produce the outburst.

If too much emphasis is placed upon the importance of control the child may become so distressed at wet clothes that what is really a routine bodily function becomes an event and achieves undue importance. Sometimes that has the effect of so completely occupying the child's attention that he cannot play freely. In other cases the effort at control is exaggerated until the child is unable to urinate freely, or constipation results. Emphasis upon the importance of elimination may make the child self-conscious and arouse an emotional coloring which serves no good end. The importance attached to continence may keep the mind occupied with the problem of elimination and consequently act as a suggestion which brings about involuntary lapses.

Children are uncannily clever in making use of elimination as a device for controlling the situation. Three-year-old twins, who had to wear dresses which they disliked, were overheard remarking to each other, "Never mind, we can wet ourselves and then

we will have to put on our other dresses." One of these girls persistently wet herself at the nursery school, although she had been there long enough to have outgrown any tendency due to strain or excitement in a new situation. It happened one day that the laundry had been delayed so that no clean dress was available. Before starting to school she was told by her mother, "I really don't know what you will do today if you wet your clothes, because there are none clean to send out with you and there are no clothes in your locker at school." The child clearly understood the situation and took care that her clothes were not wet that day. As the result it was decided never to take any dry clothes for her in order to make sure that she had no excuse for carelessness. From that day until she left the school she had no need of dry clothes.

Another three year old found that the best means for obtaining in the school that personal attention which was his undoubted right at home was to wet his clothes. Expressions of disappointment or disapproval seemed to be preferable to being ignored. Apparently he was like the woman who said she would rather be talked about than not mentioned. At last his lapses were treated in a casual manner; his clothes were changed for him but without comment; he was not even allowed to dress himself. Nothing was said about the matter, but great pains were taken to make sure that he was praised for anything which he did satisfactorily during the day and was given the undivided attention of the adults for brief periods of time. In other words, care was taken to make sure that he had a chance to realize that he was a person of worth in his own right and that his significance was greater when he behaved in the manner desired than when he acted like a much younger child.

It is indeed difficult to teach a child to assume responsibility without attaching too much importance to the matter. The significance of a direct, casual attitude must always be kept in mind. On the other hand, because children do differ so greatly in their ability to learn quickly, one child may require a much longer practice period than another. Even in the child who is fully trained, lapses may occur. Any involuntary urination may be a symptom of the onset of a cold or the beginning of another disease. Excitement, being chilled, acidity of the urine may

cause temporary lapses. It is frequent after tonsilectomy to find a recurrence of bed wetting in a child who for months has been accustomed to dry nights.

Perfect control may appear to be possessed as long as conditions are favorable. If, however, some adverse situation appears, control breaks down. In cold weather the frequency of accidental urination increases. Undoubtedly both bladder and bowel control may be reduced by any irritation either mental or physical. In fact such loss of control may be the only indication of irritation. H. G., aged three, wore casts for a month because of pronated ankles. Although his walking was made much more difficult and his freedom greatly limited, he apparently was as gay as usual and seemed to suffer no ill effects at the time. After the casts had been removed, however, accidental eliminations became frequent, and any attempt to urge continence served only to make the situation worse. When care was taken to remove any source of strain due to calling his attention to his errors and great pains were taken to surround him with an atmosphere of indifference to misadventure, control was regained.

Privacy is an important factor in establishing habits of elimination. The need of solitude or privacy exists quite independently of any training in convention. Just as any bodily function which is not aesthetic is objectionable if performed in public, so the evacuation of bowel or bladder is a private function. It has neither interest nor pleasantness and is a concern only of the individual involved. It is wise to avoid establishing in the child any ethical or moral connotation.

There seems to be justification for the common toilet so often found in nursery schools in that the child can be so highly habituated to privacy that any interference with the usual situation interferes with functioning. It is true, however, that before a habit can be generalized it must function perfectly in its regular situation.

Any unnecessary stimuli may distract the child from the business at hand.<sup>3</sup> Picture books, toys, conversation, or any such extraneous element may divide the child's attention and hinder prompt functioning. Successful evacuation of bladder and bowel is facilitated by the relaxation which comes with adequate habituation. Voluntary contraction of the abdominal muscles aids in

initiating the processes of evacuation. Both these contributing factors are interfered with by distracting events or objects. Consequently there are advantages in solitude and in allowing nothing except the necessary equipment in the bathroom.

One source of the interruption in toilet habits which is apt to occur when a child enters the nursery school lies in the variety of new and interesting sensory experiences. Some children become negatively adapted very slowly. With others the response is less and the process of adaptation more rapid.

Both urging and encouragement tend to distract the child. If the bowel movement is delayed it is better to let him get up from the toilet and then shortly return for another attempt than, by urging, to lend undue importance to a routine activity. If a child sits on the toilet for a long period, not only is he irritated but there is danger of prolapse of the rectum from the prolonged futile effort.

Anxiety is always a hindrance. Concern on the part of the adult responsible transmits itself to the child. If mother or nurse is alarmed regarding the ill effects of constipation, her alarm arouses in the child either an anxiety or else a resistant attitude as a protective device. Consequently the very result the mother or nurse desires so greatly to attain is prevented. In other words, it must be recognized that there is psychological as well as the physiological constipation.

The child's capacity to care for himself at the toilet should be made use of as fully as possible. On the other hand, to burden the child with the responsibility of buttons and buttonholes before he is able to manipulate them easily may interfere with his willingness to note and respond to the sensory warnings. Since ability to handle his own clothes makes self-management possible, care should be taken that the clothes be simple; the child should be taught how to handle the necessary fastenings. The two-year-old boy can be taught to urinate standing even before he can manage his clothes.

One reason for making independence possible is to free the child from too marked a conditioning. One two year old found it actually impossible to urinate at the nursery school. Lacking the conditioned stimulus of his mother's presence, he was unable to urinate. Since he did not wet his clothes, it was evident that

his muscular control was strained beyond a point that was wholesome.

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## CHAPTER XVI

### SELF-MASTERY: SUBJECTION TO AUTHORITY

It seems unavoidable that any sort of social relationship should entail the interference of one person with another. The advantages of social life, the mutual aid and comfort, the stimulation to greater activity—these gains are to some extent offset by the limitation and cramping of individual development. A tree growing alone in a field attains a symmetry, a perfection of form, a strength to resist storms which cannot be equaled by a tree growing in a forest. It draws into itself all the richness and strength from the soil of the large area surrounding it. Nothing planted around it will grow so freely or so perfectly as the same things planted just beyond the reach of its roots. Not only does the shade it casts interfere with the growth of other plants, but no nourishment is left for them in the soil.

In a democracy, or in any group which is endeavoring to provide for the development of each individual, there is, inevitably, interference one with another. This interference may be within the group, it may come from outside the group, or it may be a collision of one group with another.

It is impossible, however, for human beings to develop in isolation. Not only are infants and young children dependent upon the group for those needs which must be satisfied if life is to be preserved, but normal human beings are dependent upon one another for the satisfaction of their need for each other. The final stage of development is dependent in part on the innate capacity of the individual. Capacity, however, is not a matter of automatic development but requires the stimulus not only of a material world but of a social world.

The difficulties in which family life is constantly involved, as well as the pleasure and privilege developing therefrom, arise out of the impinging of one human being upon another. This interrelationship that augments the development of each at the

same time alters and limits the freedom of individual development. Social life involves both interference and mutual aid.

The very concept of the word adult is developed out of the notion of a series of experiences. There could be no such thing as adult unless the individual had in some degree profited by experience. This notion also implies the achievement of a capacity for safeguarding those of lesser experience. It is obvious that if a group is to be maintained it must consist not only of a given group of members but of a younger group who will in time come to full membership. These younger members, children, must be protected and given opportunities for development so that they will be fit to take the places of the adult members when their strength is exhausted. Because of the need of the immature members of the group, responsibility of parents has grown out of the parents' maturity. Obligation devolves upon parents by virtue of their greater chronological age. Supposedly they have profited by their own experiences so that they have a store of knowledge and skill to transmit to the younger members.

By virtue of their greater skill, knowledge, and power they become invested with a legitimate authority. There is a sort of indirectly achieved authority due to cunning or unfair uses of power, and there is also a negative authority which is due to weakness or refusal to assume responsibility. When authority arises out of personal relationships it is apt to be used for the benefit of the person possessing it. Successful training of children is achieved when the source of authority is perceived to be in the situation rather than an outgrowth of personal relationships.

Any sort of authority restricts the freedom both of the one who exercises this authority and of the one who is directed. The former's freedom is limited because he assumes the responsibility for the individual he is guiding.

The child's freedom is unavoidably limited by his inability to guard and provide for himself. His dependence upon the older members of his group for care, food, shelter, and affection in itself subjects him to their authority. On the other hand, through this means, he is preserved and given a chance to attain adulthood. Thus authority has a definite function in that it preserves the child.

While the child learns to subdue his own wishes to the needs of the group he learns at the same time how far he may go in satisfying his own needs. Through trial and error he learns to acquiesce in the demands of the group. Through trial and error also he learns how far he may go in asserting himself.

A child is generally regarded as well trained, self-controlled, or well behaved when he conforms to adult notions or at least avoids the creation of disturbances. Conventional behavior derives its value from the necessity of individual limitation inherent in group activity. Conventional behavior, however, does change from period to period, from locality to locality, from group to group.

In the training of an individual child the distinction between the convention which is a meaningless form and that which facilitates social relationship is a tenuous one. Parrot-like repetition, when prompted, of such phrases as "thank you" has little significance for the hearer. Nor is the child's learning greatly increased. On the contrary, a negative adaptation oftentimes develops.

Through trial and error a little child comes to some perception of the value of conventions, that is, approved behavior. Children's notions of what constitutes conventional behavior in themselves may, and frequently do, differ from the adult's. On occasion conformity to their own mores seems to make any approach to adult convention impossible.

As the child develops an appreciation of his place within the group, he learns to mold his behavior in such a way as to avoid trespassing on the privileges of others. No amount of so-called good manners will atone for a basic expectation that other people will provide the necessary conformity.

The exercise of authority becomes obnoxious when it attempts to protect the child from experiences or when it is used by the adult in making experience on the part of the child unnecessary. One reason that mediocre foster homes are more effective than even the best institutions is that in the foster home the child attacks life directly while in the institution authority almost altogether determines what he is to do as well as the manner of doing. Not only does the child go through the movements of living in a mechanical fashion, but in addition his stereotyped



life makes no provision for the enlargement of his own experience.

Authority may be defined as an aid in establishing the form of the child's reactions. In an age when adults knew exactly the form that a child's reactions should take, discipline played an



FIG. 10.—The child needs wholesome activity.

accepted part in child training. Now that childhood is looked upon in so different a fashion, discipline is questioned.

Because the adult has substituted his own wishes, his convenience, his authority, for the child's experience, discipline has been used to secure immediate results in behavior which to the adult seemed good. Discipline is often a pretext for ridding

oneself of the annoyance caused by the child's exuberance, by the unskillful exercise of those very powers which will, in years to come, make him a valued member of his group. The higher the level of energy, the greater the originality of the child the more apt he is to collide with authority. Unfortunately the use of authority frequently lays the adult open to the charge of governing by collision; that is, he waits until the child does something wrong, then settles matters.

The exercise of authority may be used as an excuse to justify experimenting with the child. The adult who experiments with the child by poking him, annoying him, caressing him excessively does so with impunity because the greater number of years is supposed to give him prestige. The child's need for wholesome activity, his immediate response to stimuli, his hunger to be doing something lay him open to just this sort of experimentation. Physically it is impossible for him to restrain himself from responding to such stimuli. When, however, he responds too vigorously or when the fashion of his response becomes annoying to the adult, then the child is converted into a subject for discipline. It often happens that an undesirable response while it is in the mild state is allowed to go on, but when it becomes sufficiently violent to attract attention it has become so very unpleasant that drastic means are used to curb it.

The misuse of authority which adulthood confers may bring about rebellion on the part of the child, may produce an excessively suggestible child who has lost whatever capacity he may have had for initiating and planning his own behavior, or it may obscure the child's uniqueness as an individual so that he becomes a good deal of an automaton.

Since children, by virtue of their immaturity, are not able to fend for themselves, authority does have a genuine function in child development. This function is exercised in what we may call discipline. Discipline may be positive or negative, creative or destructive. Undesirable responses, because they interfere with the child's future development, are to be inhibited.

The right use of authority will find its function in the encouragement of desirable responses. If virtues are built up, faults tend to disappear. It seems to be easier to devote one's energies

to lopping off objectionable behavior than to select desirable forms for encouragement.

In the next place the right use of authority will develop capacity for self-direction. This involves a certain freedom for



FIG. 11.—Help that is not actually necessary becomes a hindrance to the developing child.

trial and error behavior, an early assumption of responsibility for the consequence of what one does, and a chance to try one's own wings. Help that is not actually necessary becomes a hindrance to the developing child. Pestalozzi's statement "I found that no man in God's wide earth is able to help any other man. Help must come from the bosom alone" has lost

nothing of its pertinence. It is always necessary to remember that in the last analysis each individual is isolated from every other individual and that if he is to function satisfactorily to himself he must learn to struggle with himself and for himself.

Authority sometimes forgets that "every child must do his own growing." Because this growing is done within a group, it cannot be done with perfect freedom. It must be a freedom within the limits of the situation. This guidance begins at birth whether or not there be the help of adult wisdom.

The child frequently is judged as though his perception of value were identical with the adult's. On the contrary, the child's perception of value, because undeveloped, inevitably differs from that of the adult. Through the expression of approval and disapproval the child comes to recognize whether or not his conduct is right, that is, acceptable, to others. Here again trial and error are to a large extent his guide. This is inevitable in view of his own inexperience and in view of the fact that conduct acceptable to one group may not be acceptable to another. Approval of desirable behavior is a more potent aid in securing a repetition of that behavior, because it is more economical than the wasteful method of permitting undesirable conduct to be followed by disapproval.

Obedience in itself has ceased to be a supreme virtue but becomes important and necessary in order to insure the child's escape from undesirable attitudes and forms of behavior. Disobedience often happens because obedience comes to have a flavor of convenience for parents. The tactless interference with something the child has started, the unreasonable or unfair or contradictory commands, unfulfilled threats, unfulfilled promises produce a state of anarchy. How can a child behave obediently when he fails to understand what is wanted of him or when he is keen enough to realize that unreasonable obedience is expected?

The child frequently learns exactly the opposite of what we think we are teaching him, because he learns to do the things which meet the case as he sees it. In the beginning, a response occurs in connection with a whole group of stimuli. What the significant stimulus in that group may be is often obscure. The adequate stimulus for the child may not be that which seems most

significant to the adult. The child never learns to do the thing that fails to meet the case.

His recognition of himself as a unique entity, his appropriation of the experiences offered by his environment may transcend his skill in managing his affairs. Frequently his objective as seen by himself differs from that objective as seen by the adult, nor is the adult always able to comprehend exactly where the child is. To be effective, training must begin with the child in the actual place where he psychologically exists.

Training is both negative and positive. When a child is learning to do a certain thing he is simultaneously learning not to do something else. When a girl is learning to play hop-scotch she is learning not only exactly how to hop according to the rules of the game, but at the same time she is learning to avoid certain technical errors such as stepping on the chalk lines. The child learns to avoid activities which are neither pertinent nor effective. Since the child's goal and the adult's goal may not be identical, the child learns to do those things which solve his own problem. On occasions this is his only means of self-protection, since he is so easily confused as to what really is demanded of him.

There is more than one way of reaching any desired end. What seems at first sight to be the direct method may in the long run actually lead away from the desired goal. When involved in a situation with a child, it is very difficult to know whether or not insistence on a point concerning which opinions differ is worth while. The inexperienced teacher or parent is inclined to fear that any latitude will be a confession of weakness, of inability to handle the situation. A doctrine provocative of both good and ill is that what has been started must be finished.

With experience comes the skill that enables the adult to judge whether the immediate end or one more removed is of greater significance. Just as the skillful fisherman knows when to release the tension on the line, so the expert parent knows when a little leeway will actually be conducive to the desired behavior.

The intelligence of child as well as adult should be functioning in the solution of these problems of personal relationships. There are occasions when the child is right. His judgment is not always wrong. At times he needs leisure, freedom from a feeling of pres-

sure in order that he may adapt himself to the adult's demands. Coercion, on the other hand, serves only to increase his resistance. The persistent person is almost certain to gain his end because other people forget what the fuss is about. Their attention wanders to other subjects. So the child may have the advantage of the adult.

The adult is in danger of allowing his attention to wander from the matter in hand. Unless the end in view is kept clearly in mind, the child is able to wear him out and settle the matter as he himself pleases. Because the adult is very apt to be distracted by any one of a thousand interests or duties, and because the child's mind is centered on the particular situation, the child frequently wins by superior persistence.

Perhaps it is because the grown-up recognizes his limitation in this respect that he dare not pursue other than the direct method of coercion. Heightened response on the part of the child occurs almost inevitably in such cases. It would seem that the emotional disturbance and the wasted energy are very seldom justified.

Since, ideally, the development of self-control is necessary for the assumption of adult responsibility, it becomes important that the child inhibit unsatisfactory responses and also that he be able to determine whether or not a given response is satisfactory. Punishment aims at assisting the process of elimination. Punishment may come through the results of behavior. When the boy plays with electrical apparatus he is apt to experience electrical shocks of greater or less intensity. If these shocks are sufficiently great they tend to eliminate certain fumbings or wrong management of the apparatus. If all punishment could come as the inevitable consequence of what the child has just done, if punishment could always be connected with the offending deed, it would serve its purpose far more effectively.

All too frequently the pleasure derived is greater than the pain involved, so we fall into temptation. We remember the pleasure and forget the sad consequences. Experience is so dear a teacher because the results of experience are so far separated emotionally and in time from that experience. Experience, however, is not soft-hearted, like parents who when their children misbehave hope for the best, condoning the present. There are parents who

proceed in the opposite direction and punish on the installment plan with compound interest.

Life not only punishes us but rewards us. These rewards come through the success of our undertakings and through the satisfaction derived from what we have done. When a human being steps in to give reward it should be for performance and not for cessation of misbehavior. The greatest reward comes in that feeling of mastery, the joy of accomplishment in independence.

## CHAPTER XVII

### HINDRANCES TO EFFICIENCY

It so happens that human beings are frequently forced to live below the level of their possible effectiveness and, therefore, content themselves as best they may with less than an ideal degree of satisfaction and comfort. When an individual comes into the world it would be desirable that he develop freely without the incubus of error and handicap which pulled down his elders. Yet failure to fulfill the hope and promise of childhood is all too common.

The present discussion concerns itself not with the production of better material but with the complete utilization of material available. It is not necessary, therefore, to go into a discussion of the influence of heredity in order to consider the warping of the growing, developing human being. These warpings have been christened "behavior problems," and the individuals involved are called "problem children."

The adjective "problem" is not used in the first person but only in the second or third. It distinguishes the individual who shows to a marked degree those unfortunate traits which characterize the average human being. This exaggeration is made evident by a collision with authority—home, school, community—or conflict with contemporaries.

### INEXPERT BEHAVIOR

As a matter of fact, every human being is dogged by behavior problems, and a complete list of problem people would include all of us. We do not call ourselves problem cases, for we see ourselves always surrounded by the halo of our own aims and aspirations, our hopes and fears. We are gentle in our judgment of our own difficulties because we are familiar with the extenuating circumstances.



Behavior problems are symptoms of inexpert handling of the complexities of human relationships. Discussion of behavior problems has become so general that it seems unnecessary to take up in detail each of the many difficulties. A partial list, taken from an article in *School and Society* by W. Carson Ryan, Jr.,<sup>1</sup> is as follows: the rude, fresh child; the bully; the shy, backward child (the one who cries often); the lazy, indifferent child; the defiant child; the child who steals; the child who lies; the fussy child; the talebearer; the self-assertive child; the nervous child.

The list of bad habits given by Thom is: feeding, elimination, sex attitudes, jealousy, fear, anger, temper tantrums, pugnacity and shyness, destructiveness, delinquency, complication of habits, acute personality changes, and convulsions.<sup>2</sup>

These lists might be almost indefinitely supplemented by descriptions and discussions quoted from the literature. It is a great advance in method of dealing with children to recognize that life is complicated and difficult, even for immature individuals. It must never be forgotten, however, that behavior problems in a child may be the reflection of difficulty or failure on the part of those adults with whom he associates.

It sometimes seems that in training children parents correct those mistakes which their own fathers and mothers made in training them. This correction or even overcorrection lays the child of the third generation open to reciprocal difficulties. The father who has had to struggle for even the necessities of life, to say nothing of his own schooling, is very apt to swing to the other extreme in action if not in words. So the generations follow a zigzag course, a swinging from one extreme to another. A generation of severe discipline is followed by one of laxity; that of careful religious and moral training is succeeded by a somewhat free-and-easy trust in nature.

Whatever behavior solves a situation satisfactorily is apt to be repeated. A solution satisfactory from the child's point of view may, it is clearly recognized, be unsatisfactory from the grown-up standpoint. It happens all too frequently that the lesson actually learned is not the lesson the adult thinks he is teaching nor the one he hopes the child is learning.

*The New Yorker*, which deftly, if firmly, punctures certain foibles of the professional child-studyist, carried the tale of an

affair staged in a Fifth Avenue penthouse. A child who had successfully inserted a bean in his nose refused to allow first aid either amateur or professional. Finally a specialist arrived who proceeded to make a game out of the necessary use of speculum and tweezers. Before long the boy permitted the proper use of the latter and the bean came out. Hardly had the exhausted specialist reached his home when the telephone rang and the boy's mother said, "Oh, Doctor, he had so much fun he has pushed the bean inside his nose again."

One of the baffling facts of child development is that children react differently to environments and methods of training which are intended to be identical. To the adult they are alike; to the child they are not the same. This difference is largely due to the fact that children and adults respond to different elements and regard different aspects of the total situation as most significant.

It is not always perceived that the solution which is satisfactory to the adult may be entirely unsatisfactory to the child. Yet a moment's reflection makes it clear that the child's objective, as seen by himself, is bound to differ from that objective as seen by the adult. Moreover, the child may be confused as to what actually is being demanded of him. It is only fair that he be judged from his own immature comprehension of value rather than in terms of the adult's perception of value.

These so-called behavior problems may be passing phases which will disappear with increasing experiences provided they are not fixed by unwise treatment. Inexpert solving of a situation may become hardened into a customary practice if it be treated as deliberate and intentional, rather than as inexpert behavior.

A child who knew perfectly well how to lace his shoes sat doing nothing, wearing on his face an expression of deliberate stupidity. This interpretation of his expression was not his but that of the grown-up observer who scolded him for not attending to business. Hardly were the words out of her mouth when she saw that the tin end had come off the shoe string, making it quite impossible for the child to get it through the eyelet. Of course it was easy for the adult hand to twist the end into a point which would go into the hole, but this perfection of coordination was quite beyond

the child's capacity. He had solved his problem and gained his end, that is, the needed help, by using the technique available.

If a child is uncertain as to what really is expected of him there is nothing for him to do except use his own judgment regarding the proper response. His judgment, unfortunately, is not always sound. When his judgment is unsound, the resulting behavior lays him open to punishment. One of the simplest methods for gaining one's own end is to give way to a violent expression of emotion. He sees adults get what they want by storming or shouting or weeping. He realizes that when a parent is exasperated he flies into a torrent of temper, often punishing excessively. Then when the storm is over and the atmosphere cleared, penitence on the part of the parent, coupled with the renewed obedience on the part of the child, brings about an atmosphere of renewed contentment.

The child who is distressed expresses his stirred-up state by crying. The diffused energy must find an outlet. Crying, however, increases by its own momentum. To stop crying may become almost impossible. Another outlet for the diffused energy may be substituted, however, and as a result the crying ceases. Almost any motor activity will suffice. In climbing stairs considerable energy is expended. When the child sits or stands in one place nearly all of his available energy can be devoted to crying. When he climbs there is less crying-energy available. Many a two year old has utilized his energy in going upstairs to the monotonous repetition of one foot and then the other, one foot and then the other, until none was left for crying. Having stopped, there was no point in beginning again. The use of crockery as ammunition is a satisfying activity to the angry adult not only because of the joy in making something happen and the satisfaction in the sound of smashing but also because the violent movements of throwing drain off the free energy liberated by the anger itself.

In many cases isolation is a great help to the child, for, by being separated from the group, he has leisure to relax and is freed from the necessity of maintaining his position for the benefit of observers. Isolation, however, is by no means a panacea. Friendless and alone, a little child may be so disturbed that long weeks or months of friendly relationship are necessary to reestab-

lish his confidence in these powerful but mechanical adults. One great value of isolation as a method of discipline is that it gives the adult leisure to recover his forces and to decide what policy should be pursued. It gives the child an opportunity to watch the other children and from observation to learn how to play amicably with them. Separation from the group is not of universal value and owes its effectiveness to intelligent and discriminating, rather than universal, use.

Activity invites difficulty; it is the child full of energy who collides with all sorts of obstacles, personal and impersonal, animate and inanimate. The child's activity predisposes him to mischievous behavior because he lacks that discrimination which would enable him to select an outlet which is acceptable to others. Any parent of a high-powered child can bear out this observation. Holt<sup>3</sup> says that an organism which "is doing nothing in particular is peculiarly susceptible to being started doing anything."

The attempt to interfere with undesirable behavior may serve to increase and to prolong the very activities that are regarded as undesirable. When a child is screaming, to talk to or at him merely increases the volume of response and does nothing to clear up the difficulty. The response is increased by each additional experience. At such times it is practically impossible to refrain from offering additional stimulation. Consequently it is wiser to provide such vigorous stimuli that the impulses must spread into a variety of other channels.<sup>4</sup> It is because sudden, strong stimuli interrupt the sequence of nervous impulses that they are effective in restoring equilibrium. Because spanking does this effectively resort to it comes so frequently. It takes intelligence to find other methods which salvage this good without continuing the disadvantages.

#### THE CHILD'S USE OF INEXPERT BEHAVIOR

It is no wonder that the child soon learns to get what he wants by means of explosive emotions. He compensates for his physical limitation, he defends his incomplete understanding, by violent outbursts. Almost invariably he puts himself into a position of importance he succeeds in dominating those who are stronger and wiser than he and makes himself the center of his world.

It is surprising how quickly a child learns to connect an outburst with painful or with pleasurable results. When he finds that the eruption is fruitless, he soon restrains himself, although he is very quick to perceive a change in the situation which may lend power to his tumult. One reason that temper tantrums on the part of children and adults are so common in public places is that publicity increases their effectiveness. The violent onslaught of the emotional storm by its suddenness is apt to destroy the poise of parent or nurse. This, of course, is especially true if fatigue or strain reduce the resistance of the adult.

An audience is an essential factor. No emotional disturbance is effective in solitude. Violent expression of irritation may serve to drain off the undue energy through a physical form, such as kicking the door. Such an outlet is seldom used if the individual runs any risk of hurting himself. An animated recipient provides much more effective drainage than inert material.

When pressure of the environment, either animate or inanimate, becomes too great, an individual may perfect a device which will preserve his own freedom and permit him to follow his own interest. This protective device, known as negativism, simply means that instead of responding in a logical or constructive fashion, the individual substitutes a behavior which is diametrically opposed to that which is desired by others. Negativism may become a powerful and effective tool by means of which the individual forces his own way to the accomplishment of his own ends.

No child is spontaneously negativistic. He learns through trial and error that if he persists long enough he can outwear almost any adult opposition. This he accomplishes by never shifting his attention from his goal and by watching carefully for a lapse in the attention of the adult. The child is only one of the elements to which the adult must respond. The adult's mind is taken up with a variety of responsibilities and interests. As soon as his attention is shifted from the child's demand, or if he believes that superior strength has won the battle, that minute the child slips in with an inescapable return to the original point and gains his own victory.

So by his persistence he wears down opposition, or by violence he stampedes the adult, or, because he directs his energy to the

accomplishment of a single end, he overpowers the diffused energy of the opposition. The more frequently the child succeeds in gaining his own ends by maintaining an antagonistic attitude the more firmly intrenched he becomes in negativistic behavior.

It is an easier matter to shake the head from side to side (negation) than up and down (affirmation). After the same fashion the negative word enters the child's vocabulary before the affirmative. Consequently, there is often an apparent refusal on the child's part. This supposedly negative attitude may be taken seriously by the adult. If the latter then insists upon conformity and immediate acquiescence, this negative response may become fixed in the child's behavior. Negativism, however, is apt to disappear "if it is given little to feed upon." To allow the child a little leeway as far as time is concerned, to let humor or playfulness tinge the request may prevent development of a negative attitude. "The important thing is to change the rhythm, which is too strong for the child to manage by himself."<sup>5</sup>

Frequently a negativistic set may linger in the child's speech habits long after the mood or other emotional accompaniments have disappeared.<sup>6</sup>

When stimulation is too intense the child may protect himself by refusing to respond at all. This so closely simulates negativistic behavior that it is apt to be so treated. There are times when it is impossible to prevent excessive stimulation, and on such occasions the child should be granted a privilege which the adult claims for himself, namely, that of withdrawing for the moment, of rendering himself impervious by refusing to respond. Such avoidance of overstimulation by inactivity occurs perhaps more often than we recognize.

Whenever methods of behavior become ineffective the child is quick to drop them. He is just as quick to establish those effective methods which we call good habits. These, however, are often taken for granted by the adult. We expect the child to be honest, orderly, prompt, cooperative, and friendly. We give him little or no credit for doing the things which we think he ought to do. We take it for granted that he should behave in a way which makes life easy and comfortable for his group.

Although it probably has never been tried, theoretically it stands to reason that if the child were treated with the same

courtesy, considerateness, and honesty which are expected from him, he would give us generously these good traits. Unfortunately the limitations of time and strength, the handicap of ignorance and carelessness on the part of adults make it easy for the child to develop all those attitudes and characteristics which are called problem behavior.

### TEMPERAMENTS

It is not always easy to appreciate the marked differences in temperament which exist in very young children. While this is not the place to discuss personality or temperament at length, it is important here to note that a good deal of the behavior which a rapidly passing fashion of speech has called "problem" arises out of adult failure to understand the significance of these differences.

J. cried bitterly and protested with vehemence against wearing a pair of leggings that her brother had outgrown. She, by the way, adored her brother and regarded his possessions and all his ways as perfection itself. Her own leggings were at the cleaners; stormy weather made wraps a necessity. To the adult she was behaving in an absurd fashion, elevating a non-essential into a matter of importance. To J. it *was* a matter of importance. Interest in detail, love of precision laid her open to difficulties. On the other hand, such traits are of great value. In almost every instance J.'s emotional outbursts have been due to unexpected change in routine or in situation. This cause of explosive behavior in children is more common than adults realize. The remedy lies not in insistence upon a non-essential (that is, non-essential from the adult's point of view) but rather in building up poise and a certain tolerance for change. Occasionally the child actually is in the right. On other occasions, either fashion would be acceptable.

Perseveration is another source of both desirable and undesirable behavior. The "tendency to continue in a given mode of behavior when external pressure . . . has been reduced to a minimum" is called the perseverative tendency.<sup>7</sup> Cushing enumerates four phases of this perseverative tendency: "(1) the tendency of ideas to spontaneous recurrence, (2) sensory lag or after effect, (3) interference effects of preceding mental processes with those following, (4) the tendency to continue working at a

task when there is no objectively defined end."<sup>8</sup> Her suggestion is that much misbehavior may in reality be due to this perseverative tendency.

The common dislike of interruptions and the consequent irritation are not limited to adults. People, child or adult, differ greatly in the degree to which they possess this trait. Aimless play, play with materials which yield no new experiences, much teasing, tiresome repetition of movements, words, or sounds, a great deal of what is called stubbornness—all these may be due to a perseverative tendency. So also may failure to respond promptly to requests.

The opposite tendency also may lead to difficulties in behavior. The child whose attention shifts with great rapidity, who dashes from one idea to another and flits from one activity to another may, by virtue of this predisposition, fall into difficulties. The very lack of perseveration makes him prone to distractability. Consequently, he may find it difficult to hold himself to the completion of an undertaking. Finding it difficult to finish what he has begun, he takes greater pleasure in beginning something new. For him the romance of the untried finds no check in perseveration.

Such individuals are sometimes described as erratic, sometimes as flighty. On the other hand, this readiness to accept new ideas and to try the unexpected lends a certain charm and makes them, on the surface at any rate, more adaptable. In moderation, this trait makes for good companionability and no doubt contributes to the personality of what is called a "good mixer."

Frequently it is necessary to finish an enterprise once begun, because that undertaking involves other people. This, of course, is of the essence of social organization. Individual caprice is tempered and molded by the needs and privileges of the group. Here, again, the trait has its advantages and yet may, if carried to excess, lead to serious difficulties.

Inability to adapt to new situations may be due to either of these tendencies. The flighty individual finds it difficult to adapt because his attention shifts before the adaptation has been completed. The contrary tendency of perseveration may underlie that intense habituation which makes the individual unwilling to try new things. This type of difficulty in adapting



to new situations has been discussed in another place. Here it is necessary only to call attention to the fact that shyness or diffidence may be due to the perseverative tendency. S. actually suffers when putting on new clothes. At the age of a year and a half he protested against a new coat, saying, "No new coat," and rolled on the floor in despair. Just before he was two he refused to take a step in new shoes but stood stock still, crying and crying. This is not stubbornness or negativistic behavior in the sense in which those ambiguous words are often used. In training children of such a temperament it is easy to develop addiction to routine. This shows itself in a dependence upon the familiar and an unwillingness to tackle a new situation. New playthings, new foods, new clothes, new people—all present almost insurmountable difficulties. The child clings to the familiar person, adores old playthings no matter how battered they are, prefers his well-worn clothes, and eats only a limited diet.

Obviously, shyness, diffidence, timidity, backwardness are due to a multiplicity of causes. The difficulties in behavior which are described by these words are not solved in any simple fashion, nor is there a panacea. Intelligent study makes trial and error teaching less of a random activity, but not yet is knowledge adequate to meet the need.

Sensitivity, both in the colloquial sense and also in that of actual sensory acuity, may predispose the child to unfortunate responses. A., for example, seems to be so sensitive to sound that she is easily disturbed and distracted. B. finds the touch even of ordinary paper so rough as to be disagreeable. So we might go through the list of the senses. To what degree such acuity exposes the child to overstimulation and the consequent explosive behavior is not yet known.

These personality or temperamental qualities appear in earliest infancy. Mothers' descriptions of their babies show clearly how common such differences are in everyday life, in sleeping, in eating, in quietness or restlessness of behavior. From this brief discussion it is obvious that the child's capacity for learning is to a very large degree dependent upon his temperamental traits.

To attribute undesirable behavior to temperamental traits which have their roots in the physiological mechanism is not to

extenuate or to suggest that such behavior is unchangeable. Further study is needed to reveal the methods of training which will capitalize the value in such traits and offset the handicaps they provide. So incomplete a discussion of temperamental traits is included here merely to call attention to their basic importance and to suggest the need of studying each individual temperament.

"Surely it's very surprising that flowers should grow for one person and not another in the same garden and under the same conditions . . . "

"Plants are like children, sir; they need handling. Ignorant persons or persons who don't care enough about them can't handle them proper.<sup>9</sup>"

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## CHAPTER XVIII

### PLAY

"Play is almost as much dependent upon learning, the fixation of habits, and the organization of responses about objects and situations as are the serious situations" of adult life.<sup>1</sup> For the present discussion the significance of this statement lies in the suggestion that learning functions in the development of play. That play facilitates learning, that learning takes place by means of play is implicit in the theory, which accounts for play as a preparatory exercise for the business of living.

Play may be called "the manifestation of spontaneous, free, full integrated activity of the child." There are only a few years in which the motor impulse is as "incessantly active as it is in childhood, and it is clear that children gain all their ordinary techniques by means of it."<sup>2</sup>

In their exercise of newly acquired skills, in their abandon of skills they have outgrown, "babies play at the level of their motor ability and strength and not below or above it." They play according to their own physical strength and according to their own interest in activity.<sup>3</sup> They do not spontaneously attempt anything which they are not equal to doing. In other words, the baby plays according to his needs. He may be heedless of danger, but that is because he does not understand consequences; if he is used as a plaything he will respond to stimulation beyond the point of safety.

Sports and games may be learned and are mastered because of preliminary practice through spontaneous movement. Such random movements, made in response to stimuli, in turn serve as stimuli for repetition of themselves, which need not be precise repetition but rather a repeating with variations. Discharge of nervous energy in diffuse movements gradually gives place to innervation of precise movements. Pushing a toy engine across the floor represents the acquisition of a considerable degree of

motor coordination. That the skill utilized in any operation called work comes by way of learning (even when such skill is of a low order, as, for example, the pushing of a shovel along the gutter by a street cleaner) is more readily accepted than recognition that a similar skill used in play is developed through practice. This is due to the fact that work is supposed to be focused upon the accomplishment of some useful end. It is true, of course, that much so-called work is put through for the sake of giving an appearance of being occupied or of being an essential cog in the machine. Play is commonly defined as activity indulged in for its own sake, not to serve a secondary or ulterior end. The distinction between play and work is a tenuous one, since much so-called play is a serious business, involving little freedom of movement and rigidly controlled as to method and procedure, while much work is carried on spontaneously, being its own reward.

Smith and Guthrie<sup>4</sup> describe play as contrasted with practical conduct as "an incomplete act given in response to an incomplete situation," involving superfluous movements and lacking successful expression of the consummatory responses. Such a description of play reveals its essential difference from work for the end result of work is the justification for outlay of energy.

#### PLAY AFFECTED BY GROWTH

Both work and play, however, are possible because of the development of learning. That play involves learning is evidenced by the common expectation that the child will outgrow certain forms of play. Just after Christmas a three year old was showing his gifts with great joy until he picked up a Tinker Toy doll. He looked at it with great distaste and said, "*This* is for babies." His recognition of his growing powers was affronted by a gift which belittled them. So adults say, "Give the cart to the baby, you are too big to drag around such a plaything." A child has outgrown play materials when he has exhausted their possibilities for learning so that he is merely putting in time.

What have been satisfactory play materials and adequate play activities cease to be so regarded as the child grows older. The waving hands and gurglings that delight us in a baby become distasteful in the case of the idiot child, who lacks capacity for

learning more complicated forms of play. The sort of play engaged in depends upon the development of the central nervous system, of the receptors and effectors.

"Manipulation and exploration go hand in hand in the child's play," but "a blind child is comparatively inactive with his hands, because he doesn't see what happens."<sup>5</sup> The baby is incapable of the same sort of performance as the older child because its motor and mental equipment is inadequate to the more complicated forms of play. While the older child, simply by virtue of growth and development, is able to carry on more elaborate forms of play, his play behavior continues to show traces or remains of earlier activities. At times these traces are incorporated in the more advanced, at other times they appear to be lapses into a simpler type.

#### SPONTANEITY

Increasingly complex play responses indicate the capacity of the child to make use of the opportunities offered by his environment. These increasingly complex responses are not acquired by means of conscious effort but by virtue of the developing powers of the child which seize with eagerness the facilities available. Play responses offer an outlet for diffused energy but increasingly focus that energy into habitual paths. The goal-less running about of the child of eighteen months or a little more, who has just acquired sufficient steadiness on his feet to allow him some freedom and abandon of movement, is transformed into the purposeful running of the three year old, who runs across the playground to the jungle gym he wishes to climb. The "agee-agee" gurgling of the baby becomes the deliberate play on nonsense syllables of the three year old—"a wheelbarrow-wagon-waggity, wag, taggity-tag."

The play mood is one in which the desires of the moment find direct expression. Spontaneity, "isolation of the play situations from the world as a whole," absorption in the business of the moment—all characterize the attitude of the player.

Kirkpatrick<sup>6</sup> believes that play implies freedom to do or not to do a certain thing, freedom in the manner of doing it, and freedom to continue or to stop. This freedom accounts for the variety and disconnectedness of "early playful activities." Being free

from direction toward an end, although ends in themselves, the single sounds or movements are repeated for their own sake.

Dresser<sup>7</sup> regards the superabundant energy and spontaneity of play as especially significant for learning and says that "there are people who have known how to keep their spontaneity, so that the tendency to play has led naturally to productivity, to invention."

"Play with little children is a mood, a method of attack, and has little to do with energy or effort, except that a child puts forth his best effort when he is in a playful, happy, creative mood."<sup>8</sup>

### A SOURCE OF LEARNING

The development of play activities is the result of learning on the part of the child. Through these same play activities the child learns. All through life, hunger for sensory experiences is satisfied through play. The baby increases his knowledge of the outside world through handling and mouthing of whatever comes into contact with him. The ubiquitous "do not handle" signs give evidence that the same sense hunger is present in the adult tendency to touch whatever he looks at. The baby enjoys sounds for their own sake, quite aside from any significance they may have. The enjoyment in making sounds and in listening to sounds made by others is seen not only in the baby who bangs his spoon against his cup and babbles endlessly and in the boy who shouts at his play but also in the adult who honks his automobile horn when he is in a traffic jam. Joyful shouting is an essential part of every picnic. Much so-called punning is really a form of vocal play.

The little child's behavior is characterized by what McDougall has called an "appetite for movement." Kinaesthetic sensations aroused at first by random movements, later by both purposeless and purposeful movements, are repeated because they are pleasurable. Motor skills are developed through repetition of these movements which are satisfying in themselves.

Learning takes place not only in sensory fields but also through experimentation and exploration in play. The child's pleasure in being a "moving cause" leads to the acquisition of all sorts of new experiences and to new skills. This experimentation goes

on not only in the field of material objects, not alone with regard to the properties of things, but in relation to people as well. S., aged two, snatches any plaything that another child may have and goes off with it; he also goes up to another child and pushes him. In either case something happens. Quickly he learns not to snatch from four-year-old F., who can recover his property immediately and gives good measure by hitting S. in addition. Nor does it take long for him to learn not to push St., for St. can push harder and from a steadier base. Gradually S. is learning that the outward, defensive movement of pushing, which comes so readily and with great dexterity, is not an effective or an acceptable one. Gradually he is learning to beckon and to assist.

This experimenting with the behavior of other people goes on continuously. The child says, "I won't" and waits to see what happens. He runs away when called and is disappointed if no one runs after him. He no longer screams and beats his heels on the floor when he sees that the nursery school teacher does not respond in the expected manner.

### PLAY MATERIALS

Since play is a vehicle for learning, it follows that the materials for play should offer opportunity for the expression of ideas as well as of power. Some playthings permit themselves to be handled, some allow only watching, while a third type invite manipulation. Combining his ideas with materials the child achieves a production greater than the raw materials with which he works. Obviously it is in this creative, constructive play that he learns most. There is much he may learn by means of his struggle to express his idea. Moreover, his satisfaction in his achievement lays one of the foundation stones of mental health.

His capacity for endowing the simplest of materials with endless qualities is unlimited. The ancient packing box may become a house, a ship, a car or anything needed. The most ordinary materials lend themselves to a wide variety of uses. The greater the child's freedom to use materials as he wishes the greater his enjoyment of them and the richer his development.

Since the essential characteristics of the play impulse—the tendency to be active and the tendency to be spontaneous—make learning through play possible, whatever materials are at hand

become the stuff out of which the little child builds his own education. Because he experiments he satisfies his hunger for movement, for sensory experience, his appetite for noise, for change; in short, he feeds his own intellectual curiosity.

Whatever comes to his hand he uses. Froebel recalls his attempt to imitate the construction of workmen who were repairing a church. After watching them he tried to use tables and chairs, the only materials he had, but found them not pliable enough to serve his purpose. Ruskin's single set of blocks coupled with his isolation was not sufficient to build in him the wholesome activities which would have developed in normal and wholesome surroundings.

Delight in putting objects together, the "patterning impulse," utilizes all kinds of raw material. Those play materials which offer only the pleasure of the eye—the beautiful doll that is too elegant to handle, the fragile one that collapses at the child's vigorous devotion, the perfect mechanical contrivance that requires something more than childish skill in winding—all these are of least value in the development of learning. To be of value a plaything must be used.

Next in value come the play materials that can be used in limited ways, that offer few opportunities for constructive use and little stimulus for invention. What is called destructiveness—taking the mechanical toy to pieces, breaking up the toy meant only to be handled into its consistent parts—is often the best use, as far as learning is involved, to which such toys may be put. Out of the pieces the child invents new forms, suitable to his needs and uses.

The third type of play material—that which lends itself to many uses—oftentimes lies nearest at hand. In this day of profusion of playthings offered to appeal to the adult interest and desire, it is wholesome for the child to learn to use the materials at hand to serve his play needs. The discarded household broom is a better hobby-horse than the stick-with-a-painted-head from the toyshop because, since neither is a horse nor resembles one in its essential traits, the broom lies at the child's hand and is more fully the child's adaptation. Learning to make use of the materials at hand and to find interest and pleasure in what the immediate situation offers leads to a habit of exploring the



situation to determine its possibilities. The "Mother, what shall I do now?" plaint has its counterpart in the bored adult.

Through the use of the materials at hand the child's ingenuity is developed and he gets a comprehension of the possibilities and limitations of his materials. He learns further to attempt to satisfy through his own efforts the needs of which he is conscious.

If we regard play as a means for learning, it is obvious that the "activity should reside in the child," not in the toy. A multitude of materials may overwhelm the child with sensory experiences so that he is unable to react to them but is merely fatigued by the impact of sensory experiences. Fewer materials will stimulate the child to react to them and so serve their purpose as playthings.

Through play may come development of bodily control. Play materials may assist in this learning, may suggest activity. Often these suggestions would never have occurred to the adult. H., aged just three, was discovered on top of the horizontal ladder which was raised some five feet above the ground on posts. This ladder had been constructed to encourage the four year olds to "travel" by their hands thus aiding the development of good posture. The children, however, preferred to prop a plank against one end and a short ladder against the other. Up this ladder they climbed, crawled across the horizontal ladder on hands and knees, and then slid down the plank. So young H., whom no one suspected of being able to climb the upright ladder, surprised his world not only by doing that but by crawling on all fours across the horizontal ladder. His pride in accomplishment, his enjoyment of success can be imagined.

Adequate play materials not only encourage the child to do his own work and his own thinking but in addition give him an opportunity to do so.

Another occasion for learning is offered by a chance to take things apart and put them together again. The delightful and often disastrous or at least objectionable pursuit of pulling out drawers and pushing them in again is one phase of this. Fitting things together, putting covers on boxes, the nests of boxes of the toyshop, the wooden dolls with dolls inside—all these things develop a perception of spatial relationship and skill in manipulation. So taking apart the clock has its value as an

opportunity for learning. To separate an object into its parts may destroy it, but through such a process the child is developing his ability to comprehend relationships.

If play materials are to be teaching materials, they must be allowed to teach. That is, help in manipulation should be given only when the child asks for it. Too much help stifles his initiative. One of New York's columnists reminds adult toy buyers to purchase two mechanical toys—one for the child to play with, while the adult uses the second to demonstrate how it should be used.

The educational value of play, according to Hartman,<sup>9</sup> is that the child is made conscious of the play possibilities in his own environment, learns to see relationships implicit in familiar experience. To keep the play impulse going from stage to stage of related play is to expand the boundaries of experience and deepen its meaning.

A few years ago there was a definite attempt to capture the spontaneity and energy of the play mood for the schoolroom. The assumption was that since, in play, learning occurs with ease and speed, the adoption of play methods by the school would lead to the acquisition of school skills with speed and ease. Learning, however, is not accomplished only in the school but is a continuous process from birth to death. The school is consecrated to certain definite learnings, to the acquisition of certain skills and of information which the group regards as a desirable possession on the part of its individual members.

#### ORGANIZATION OF ACTIVITY

Energy spills over into all sorts of movements which, though apparently without purpose or meaning, are characteristics especially marking all young creatures. The world is an exciting experience. Energy aroused through contact with the outside world irradiates many motor pathways, causing multiplicity of movement. Through practice these movements become directed toward the accomplishment of certain ends which are valuable for their own sake.

This spontaneous activity characteristic of healthy young animals shortly becomes organized in more or less effective ways. Series or groups of movement which serve most adequately to

drain off diffuse energy are finally arrived at through a trial and error procedure. What the successful series or group is to be will be determined not by any preconceived idea but rather through the circumstances of the moment. A baby playing with a spoon gets pleasure from the noise and movement of banging it against the table, which is quite satisfactory until his fingers lose their grasp and the spoon clatters to the floor. This surprising event increases his pleasure by increasing his sensory experiences and also by extending his range of activity. Then, as often as the spoon is picked up and handed to him, he proceeds to amuse himself by dropping it. It would be interesting to know exactly how long a baby might find this procedure entertaining.

The baby finds much diversion in fitting objects together and breaking up objects into an increasing number. These perhaps are the simplest forms of creative activity. When some object proves to be fragile, the pleasure of destruction is discovered accidentally. What seems to be an intentional destructiveness originates in the inability of an object to stand up against the child's energetic use. As a consequence something happens and that something, even though it be a crushing or breaking or tearing, gives the child the pleasurable experience of causing something to happen.

The essence of play is that it should be pleasurable. All activities which in themselves, irrespective of result or consequence are pleasurable, partake of the nature of play.

Aimless running may be deflected into a patterned running by some such chance factor in the environment as wheel tracks. On the playground one day, when the earth was still a little damp from recent rain, tricycles made all sorts of intricate patterns crossing and recrossing. A child in his running stepped by chance between the parallel lines, then he caught the idea of guiding his running by the design of the wheel tracks. This made a game which had greater perceptual and intellectual pleasures than the mere running which he had been doing previously.

A thud of running feet, which from the floor below sounded aimless, proved to be caused by several children of three and four years who were spontaneously weaving a pattern, something like a figure eight, around the tables in the schoolroom.

When first achieved, pulling and pushing are satisfying in their own right. A little later when this pleasurable experience has lost its first freshness the child discovers that the joy of pushing, for example, is renewed if the truck is pushed along a crack in the floor or is guided along the top of a low fence.

Trial and error comes to the rescue of play, enlarging and deepening, enriching experience not alone with regard to the manipulation and construction which involve inanimate objects but functioning also in setting up reciprocal group relationships. If two children reach for the same object at the same moment a conflict may be set up which is determined by the relative strength or ingenuity of the two individuals. This conflict may be playful or it may become a serious matter when the possession of the object, which in itself need be of no importance, assumes a great value as a badge of achievement.

#### PLAY AS SOCIAL RELATIONSHIP

Play is constantly in danger of disruption from the desire for possession or the tendency to demonstrate one's own superior power. If children would only play quietly and peacefully without the uproar of quarreling! The latter seems to be the earmark of family relationships in young children.

When play meets an obstruction violence is apt to result. The energy which has been flowing freely through the channels of play activity becomes an explosive when these channels are choked. This blocking comes through interference at the hand of another child who wants to play with the same objects or who, having nothing himself to do, finds it amusing to interfere with what some one else is doing; through interference which comes because of interruption imposed from above, as, for example, getting ready for dinner or coming in out of the rain; or through interference because of the limitation of the objects or the limitations of the player. If the player finds herself unable to put the dress on the doll she may "go to pieces," jerking and pulling until either doll or dress yields and comes apart in fragments, or the child may throw down dress and doll and burst into a flood of tears.

The quarreling and biting, kicking, and screaming which interfere with the tranquillity of children's plays are frequently

due to the limitations of the players and the playthings and to the interference of one player with another. Through social pressure and through the wrecking of beloved objects the child learns to inhibit this explosive behavior which is destructive both of material and of amicable social relationships.

Fortunately chance mutual activity is sometimes successful. Two children find that they can extend the range of their activity and increase their pleasure through cooperation. Two children tugging at a board may be able to prop it up against the fence so that both may go up and slide down again. One of the essentials of leadership is a capacity for perception of the value of mutual aid. The request for help may take the form of demand or request. Practice in leadership begins when trial and error behavior reveals to a child the advantage of the acceptance of assistance.

Tentative efforts at assistance either asked for or freely given may be quenched if when first offered they are not warmly received. In the same way the first efforts at association, if successful, are apt to be repeated, while if ungraciously received they may be discouraged. Through trial and error, patterns of reciprocal relationships are initiated. Through successful repetition they may be established so firmly that they become an intricate part of the individual's attitude toward other people. On the other hand, they may be blunted by practice or repetition so that the individual becomes dulled to the pleasure. The thrill experienced by the students slipping back into the routine of college life is rubbed away in the process of daily association. Playthings or games which have been amusing become tiresome if the child has access to them constantly. Many mothers offset this negative adaptation by putting away one set of playthings and bringing out a fresh set which is new because for some time it has not been used. The plea "Mother, I have nothing to do" or "Mother, what shall I do?" may be due to negative adaptation, so that the child does not perceive the possibilities offered by the play materials.

It comes about frequently that certain plays are attached to certain play materials or situations. A family of little girls played house always in a cherry tree which offered certain comfortable seats in its branches. There was no apparent reason

that the play should always have included mother, grandmother, and child who participated in the activities in that tree house. Through constant repetition of this one particular play, the imaginative possibilities offered by the particular shapes in which those tree branches had grown were obscured.

What might be called higher units of play activity are built up. In this way a lengthy play procedure may be established, and a ritual may be built up. It may be that imaginary playmates owe their durability and longevity to this tendency to organize activities into larger units.

Play activities become conditioned responses so that a given play material comes to serve as stimulus for a given activity. There is a little boy whose mother believes that experimentation with materials should be the basic activity in all education. This little boy knows nothing to do with blocks except to throw them. So thoroughly is he equipped for the use of blocks as ammunition that there is not the least chance of his discovering the possibility of their use as building materials.

Whatever theory or combination of theories of play may be accepted as adequate explanation of the spontaneous activities engaged in by children and adults, it is obvious that play permits and facilitates sensory and perceptual experiences and familiarizes with the manipulative and constructive potentialities of objects and people. Thus the richness of the child's mental life is increased. The resources within himself are established and enlarged. In the same way his social sensitivity and adaptability are built up.

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## CHAPTER XIX

### THE DEVELOPMENT OF IDEAS

The long process which results in the acquisition of ideas begins with sensory experiences. Integration and generalization of these experiences give rise to ideas. Of the great variety that might be considered, only four will be discussed: number, time, space, and the self.

#### NUMBER

Development of the idea of number involves the notions of increasing and of decreasing quantity. O'Shea<sup>1</sup> suggests that the ideas of increase are more definite than those of decrease because "the child is concerned more with having pleasurable experiences repeated than with lessening number of repetitions of any disagreeable experience" and concludes that quite definite ideas of limitation of quantity are probably arising by the age of four.

In the development of concepts of number, concrete experiences of sequence, quantity, separation into parts, and building up the one from many are necessary. These individual experiences, necessary and important as they are, in themselves are not sufficient but through generalization must develop into abstraction of the idea of number relationship. Since the capacity for abstract thinking is dependent upon maturity, it cannot be developed by teaching alone. The idea of number involves perception of differences of magnitude or size, more or less, but also idea of more and fewer.<sup>2</sup>

Growth of the child's perception of number is marked by his increasing facility to recite number names. This repetition, sometimes rhythmic and sometimes irregular, apparently gives the child pleasure. While the repetition of number names supplies the child with a vocabulary that can be applied to the enumeration of objects in sequence, the two processes go on at

first quite independently of each other. Grouping or adding together single objects is the foundation of counting. The two year old who indicates the "successive repetitions of the same impressions by the repetition of the same words, for example, *one, one, one, one more, one more*" is building up the plural idea. Gradually number names in sequence are substituted for repetition of the same word.<sup>3</sup> Realization that the final number of a process of counting is identical with the name of the sum comes later than counting and perception of number. Hilde<sup>3</sup> at the age of three years and seven months counted the five fingers correctly, but if she was asked immediately, "How many fingers?" began again to count. "The last finger is certainly the fifth, but the collective group of fingers is not yet expressed for her by the number five."

Comprehension of the function of repetition of a serial unit in the production of a whole is a matter of increasing experience. Early attempts at counting of objects observe the one-to-one correspondence between objects counted and the number of words.

In learning to call series—one, two, three—it is the names of the positions that are learned first. In the beginning, number names apply only to series in which they were learned. Counting is mastered when separate objects, even though heterogeneous, can be named from beginning to end as one, two, three; the child must learn to "combine the naming of positions with the cumulative result of grouping." Three, for example, names not only one member but also a group.

Visual perception of number, that is, of groups, precedes any real understanding of number. At first number names are applied only to the specific groups with which they were associated, but gradually the idea of number is abstracted from the concrete situation and generalized. Binet<sup>4</sup> found that the four year old's perception of number included four and, "after some practice, five," while a two year old "could not recognize with assurance numbers beyond three."

The stages in the development of the idea of number are enumerated by Drummond<sup>5</sup> as follows:

1. No real idea of number continuity.
2. Clear idea of difference between one thing and more than one.



3. Recognition and correct naming of small groups.
4. Propensity for counting.
5. Careful and accurate counting.

Since small groups are easily recognized as wholes, the child's knowledge of number develops in two distinct ways: "recognition of groups and construction of series—counting." Koffka<sup>5a</sup> says that "serial construction and group construction remain different processes, even after the child has learned to count properly."

Gesell uses five tests for determining the stage of development of concept of number: (1) putting one or two cubes in a cup, as directed; (2) counting four, ten, and thirteen pennies; (2) drawing one, two, three, or four bubbles in the position indicated; (4) problems involving the addition of one and two; (5) knowledge of the number of fingers. Counting fails to reveal the child's knowledge of number, because "arithmetical knowledge at this stage of development is so concrete." A clear distinction between one and many has not developed at eighteen months; "not until the three-year level does the distinction between one and two assert itself in this test," that is, placing cubes in the cup.<sup>6</sup>

According to the Stanford Revision of the Binet test, a four year old can count a series of four objects—in this case, pennies—pointing to each as he pronounces the number name. Ability to count thirteen objects is expected by the age of six. At the same age level occurs the naming of three of the four coins presented—nickel, penny, quarter, dime. It is not until the age of eight that the child is expected to recognize and name the dollar and half dollar also. To be able to state the numbers of fingers on each hand and on both is expected at age seven. By the eighth year he should be able to count backward from twenty to one.

A passion for enumeration develops when the child has acquired facility in the repetition of number names and a clear understanding of the application of those names to series of objects.

E., aged four, remarked that there were four girls and six boys in the room. As this number was incorrect, he was asked to count. He made no effort at counting but said, "There's a girl, there's, and there's a girl, that makes two, no three girls."

S., aged four, looking around the dining room, counted the people at the different tables. It so happened that at all the tables except hers there were three people. This was within the range of her capacity for enumeration, but when she turned to count her companions (six) she said, "We have four here." Having been asked to count the people, she said, "One, two, three, four, five, six, seven, eight." Until she reached four she kept the one-to-one correspondence clearly in mind, but after that her counting obviously ceased to be true counting and became merely the repetition of number names. Then her attention was caught by the fact that there were three boys and three girls. This number fact which was within the range of her comprehension satisfied her so that she paid no attention to the statement that there were six people at the table.

Interest in number which shows itself first in enumeration, in endless counting, may find expression next in the reading of figures. J. at the age of four enjoyed reading the thermometer. She could count by two and had learned to think of the age difference between herself and her brother as an interval of two years. She surprised the nursery school one day by saying, "When B. is ten, I'll be eight; and when I'm ten, he'll be twelve."

Before that development children show great interest in number rhymes and in counting-out rhymes. The great popularity of "One, two, buckle my shoe" and "Eeny, meeny, miny, mo" is due not only to their emphasized rhythm but also to their number relationships.

Knowledge of money, both the value of coins and the purchasing power of money, is acquired through experience with money. The child of poor economic level is more apt to score in the Stanford Revision test (year IX) requiring the knowledge of the names of coins than the child from a well-to-do home; even a subnormal child who has had experience in handling money, perhaps as a newsboy, will pass this test far in advance of his mental level.

The child's life is full of work and play in which number is important, but always his dealing with number is related to definite situations.

## TIME

The timelessness of early childhood is broken by recurrence of physiological events, eating and sleeping, voiding of urine and feces, by the alternation of darkness and light, and by the disappearance and reappearance of other human beings. Gradually as such appearances and disappearings, such recurrences, come to be associated with time words the young child builds up an idea of the sequence of events which constitutes time as an experience.

The feelings that accompany movement give rise to a notion of time through a perception of duration. Change, beginning and ending of events or experiences—all these, according to Janet, are involved in the development of the concept of time. A one-way progression of time—an irreversible, irrevocable quality—comes to be attached to the time words of everyday use. It is through experience that the concept of duration and its significance in the orderly progression of events is achieved.

Viola Meynell<sup>7</sup> quotes from her mother's essays on childhood:

One of the privileges of a child is that he is very near the earth, he knows moss and the scudding creatures near it. When Oliver Wendell Holmes found the scent of a little box hedge to be suggestive of eternity, it was no doubt merely suggestive of time—the incalculable remote time of childhood, which stands very fairly for eternity—because he had smelt it when he was on the level of its fresh leaves.

Not only does sensation persist for an appreciable length of time, but perceptions also overlap. As Warren suggests, the instantaneous photograph of a man walking looks absurd because the perception of the act of walking is an "integration of a whole series." So also successive sounds combine into patterns, that is, tunes. So also organic sensations offer data on which perception of time is based. They are "synchronized with external events and with each other" and offer a "not inaccurate timepiece."

Unfilled time drags in passing but seems short in retrospect, since there are no objects or events to serve as landmarks for estimating duration. Filled time on the contrary flies by but in recollection may appear long because of the interesting events that occupied it.

Experimental study of time in the laboratory shows that time which is filled with various stimuli seems longer than an empty interval; that within the "sensory present," short intervals are overestimated and long ones underestimated. Time appears to vary in duration according to the nature of the events which occupy it or the state of mind of the person involved.

Zona Gale<sup>8</sup> speaking of her own childhood says that "time always bothered us. It went fast or it went slow" without interference but could neither be hurried nor held back. "'Only ten weeks more,' we invariably said glibly, when the Spring term began. 'Just think! We've-got-t-e-n weeks!'" they said to one another when vacation began. Yet "the Spring term lasted immeasurably and the summer vacation melted." They played with the idea of time. "Now is now. But now that other Now is gone and a Then is now. How did it do it? How do all the Nows begin? . . . 'When is tomorrow?' we demanded. 'When today stops being,'" was the only answer.

The importance of mental content in determining the apparent length of time is obvious to anyone who remembers the time which seems to elapse while he waits for a tardy committeeman and the shortness of the evening spent with congenial friends. It is probable that judgment of duration is affected not only by the number of events occurring but also by the disconnectedness of these events and by their significance.

If time is to be estimated, "a certain amount of attention needs to be given to the passage of time, as such." The factors which affect this estimate are: "(a) the number of events occurring in the period to be estimated; (b) the pleasantness or unpleasantness of the experience; (c) the amount of attention devoted to time, as such, during the period."<sup>9</sup>

For the little child there is no unfilled time; he is exceedingly occupied with the making of movements. Because these impressions and movements are not directly employed in the accomplishment of that which seems purposeful and significant to the adult, the latter regards the child as idle and is apt to consider the child's time as of no importance. Consequently the adult frequently interrupts the child's business, demands a rapid shift of attention which he himself would find most annoying; in short,

fails to show the consideration which the value adults place upon their own time compels them to give one another.

This notion of the valuelessness of a child's time contributes to the retrospective fiction that childhood is the golden age. This is in large part due to complete dissociation from the obligations laid upon adults by *time*.

Gradually this veneration for time and the appreciation of the transitoriness and the sequence of events are built up through experience. The baby "begins to understand that things *happen* before and after each other."<sup>10</sup> Slowly through experience is built up the notion of time before and after, of time between sleeps, of the succession of days and weeks, months and years. The idea of the succession of events in the day's routine and of the succession of days comes as the result of learning.

A child even though but recently fed may cry for his bottle as dawn begins. The return of light is early associated with the idea of sucking his bottle. In a similar fashion, animals know the hours of their master's meals by "signs analogous to those which give us our idea of time,"<sup>11</sup> that is, of successions of impressions. Experiences underlying perception of time may be divided into two classes.

1. Periodicity.

Functions of body:

Sleep.

Nutrition, etc., which "come to consciousness in form of recurring wants." "No time regularity in recurrence of these wants was established previous to the sixth week." "By the fourth month the child became hungry and sleepy at regular intervals and at fixed hours."

2. Sequences.

"Intervals between satisfactions of physiological requirements gradually became filled with successions of daily experiences."

In the eighth month the child became cross and refused to be satisfied if not taken for his usual airing.

Late in the second year daily performances became associated with the clock.<sup>12</sup>

In his third year Mrs. Moore's son used the phrase "after a while" intelligently and invented "big after a while" to indicate a longer period. All past time, immediate or remote, was referred to as "yesterday." "Now" meant at once.

Diary records of children give interesting notes regarding progress in the development of the idea of time. Dearborn gives the following data, for example:

596th day. Told of things she would do "tmrrer, wake up."

724th day. Said, "Did not go down on the beach yesterday"—her first use of this time word.

110th week. "Used term 'tomorrow' in its right sense, but next week as though it referred to future time indefinite in location, as she also used 'next summer.'"<sup>13</sup>

At three years four months Sully's son corrected his sister who in telling of an incident of the evening before used the term "yesterday" by saying, "No, last night." At the age of three years and seven months, when his father spoke of "tomorrow," he asked, "When is tomorrow? Tomorrow morning?" and then explained by saying, "There are two kinds of tomorrow, tomorrow morning and this morning. Tomorrow morning is tomorrow *now*."<sup>14</sup>

Study of the development of children's knowledge of time is based, perforce, on their use of time words. Due to inexperience, these time words are frequently used in a confused way. F., four years old, who had been ill for a few days, in response to her teacher's expression of pleasure at seeing her again, said, "I've had a cold for six weeks." It was quite evident that "six weeks" expressed not a given number of weeks but the child's feeling of having been ill for a *long* time.

"Can you button your panties?" asked the teacher. "Yes," replied L. "My mother says, 'If you can button them *here*, you can button them *here*.'" Being unable to project herself in speech back into past time and absorbed in the present as she was, she confused "here" and "there," using "here" to express both past and present but, by the emphasis placed on the words, indicating her meaning quite clearly. Another three year old was comparing notes about the newness of shoes. "Mine aren't new yet; they were new the other time before yours."

Before the child knows time words in series he has grasped bits of time information, as, for example, "We don't come to school on Saturday, do we?" or "Mamma is at home now" or "After my nap my mamma will come for me."

The child who has grasped the idea that tomorrow becomes today has reached an advanced stage. On the day after Halloween, S., four years old, said in regard to a Halloween false face which she brought to school with her, "Mother said we could play with it tomorrow and this is tomorrow so that we can play with it."

The time words first used by the child refer to the present and to simultaneous events. Decroly reports a child who at the age of sixteen months knew that the entrance of a person foretold a bath or that he was to lie down. At twenty-six months this child knew when she might expect to be given a sweet. Later comes a knowledge of past experiences, and finally a notion of future time. The Stanford Revision of the Binet test expects a knowledge of time of day, that is, morning or afternoon, at six years; a knowledge of the names of the days of the week at seven years; and of the date, that is, month, day of month, and year, and the names of the months at nine years.

The idea of time as sequence of events occasionally leads to confusion in the child's mind. M. refused to wash for dinner, saying that she had washed and therefore was all ready. A little earlier in the morning, after using water colors, she had washed her hands. Apparently this washing was so impressed on her mind as to obscure the intervening events of putting away her play materials, getting her slippers, going to the toilet, which all led up to a further washing of hands.

Children do find great difficulty in making a "time synthesis." Such a synthesis results from repeated experiences of situations essentially similar but involving slight variations. The child's facility in dealing with time relationships is paralleled by his mastery of the use of verb tenses—present, past, and future. The past tense is difficult but much less so than the future. Only familiarity with past events provides a basis for projecting similar events into the future.

#### PERCEPTION OF SPATIAL RELATIONSHIPS

Space as we know it is tridimensional, and the perception of space is built up from a combination of sensory experiences. There is obviously a perception of space that is purely visual, a tactual, a kinaesthetic, an auditory, which theoretically might

exist separately and independently of each other. A complete spatial perception involves, however, an integration of experiences from all these, and perhaps other, sensory fields. The space perception of the blind man is less complete and at the same time no doubt involves a clearer perception of the contributions of sensory channels other than visual to the total experience.

Perception of space is composed of the perception of size and shape of objects and of their distance from the observer's body, for every person is for himself the center of space. Surface perception depends chiefly upon vision and contact, while depth perception is possible largely because the two eyes "work together"; hearing and smell also play a part in perception of distance or depth. Through experience the clues received from the various sensory fields are united into habitual ways of perceiving spatial relationships.<sup>15</sup>

When the adult attempts to analyze the development of spatial perception in the infant he is at a loss, since his own memories of the integration of sensory experiences, which at first were discrete and separate, are lacking. Because the various sensory experiences of space occur simultaneously, associations between them are built up until finally the perception becomes a unified one involving various sensory fields.

Some slight insight into this process of integration is obtained on occasions when the process of awaking from sleep occurs gradually. Then objects lack their full complement of sensory data, and orientation in space is partial.

Even before birth "constant contact of various parts of the fetal body with the uterine walls for a period of months . . . must lay a foundation under the threshold of consciousness for a sense of equilibrium and vague spatial relations."<sup>16</sup> Upon this basis the child after birth continues to build what Stern calls a perception of "own space," that is, of the space conditions of his own body. As a result of the association of visual sensations of his arms and legs with the kinaesthetic sensations produced when he moves them he learns that the limbs he sees are a part of his body.

Stern speaks of perception of "original space" derived from the sensory experiences of the mouth, which later disappears when the mouth ceases to be the richest source of tactual experi-



ences. Then develops "near-space," in which the hand plays the most important part. At first his hand is a perceptual object with which the child becomes acquainted by way of mouth and eye. Before long the hand becomes an instrument because experiences of the three dimensions result from claspings, squeezing, scratching. Perception of space is further developed when the hand reaches for objects with which it has not yet come into contact after the eye-hand coordination has been developed.<sup>17</sup>

The observation of Mrs. Moore traces the development of space perceptions:<sup>18</sup>

31st day. Child able to fixate and follow, with necessary accommodations to distance, an object moved directly before him slowly to a distance of ten feet. In initial attempts at reaching, both with head (toward breast) and with hand, while the eye plainly perceived what hand should have touched, there was no accurate adjustment of arm movements to the distance at which object stood.

13th week. Child reached for what was within the range of his arm but did not try for what was beyond.

16th week. Reached for objects beyond arm range, leaning forward and moving body in their direction.

47th week. Some perception of height, as measured by himself, reaching up, standing, etc. There was no perception of depth or distance below him until the 68th week.

70th week. Learned to go downstairs.

80th week. After he found he could get objects by aid of a chair, he climbed up continually to try to get what was beyond his own reach or beyond the reach of an adult.

2 years 9 months. Asked his mother to get a star, saying, "I can't reach it; you can reach it."

The independence of form and position in the child's perception has often been commented upon. Practice has led in the adult to development of habitual orientation in space. To look at a photograph upside down is more apt to be distressing than pleasing to a grown-up, yet the little child pays scant attention to this and apparently enjoys the picture in the story book as intensely when he sits across the table as when he sits beside the reader. The figure as significant is observed with but little dependence upon its position. Recognition on the child's part seems to be unhampered by unfamiliar or novel positions.

It would seem that this independence of form and position lends aid to the young reader's confusion of p and b, and of 6 and 9,

of "saw" and "was," for example. Discrimination of these depends to a large degree upon comprehension of the right-to-left relationships of things. Or perhaps comprehension of the right-to-left relationships of things depends upon an increasing perception of the interrelationship of form and position. Perception of these relationships precedes ability to use the terms. This knowledge of words, ability to point out the right and left features, according to the Binet scale, cannot be expected invariably until the child has reached the age of six.

Another illustration of the independence of form and space in the child's perception is found in the handling of the blocks of the form board. The half-moon block, for example, is correctly related to its hole, but if the child in picking it up chances to turn the block around so that the straight edge of the block comes over the curved edge of the hole, he may fail completely to see what his difficulty is and may attempt vigorously to force the block into the hole. This behavior is not a factor of age or of mental level but may vary among children of equal age and ability.

Perception of relative size is developed through experience. In the nest of cubes used in the Merrill-Palmer performance series, the child of two or thereabouts frequently attempts to put a large cube into a smaller and may continue his effort for a considerable time.

All play materials which "fit together," like pans and boxes with covers, the Montessori cylinders, puzzle pictures, give the child experience in handling spatial relationships, even when the initial success is of the trial and error variety. The child's enjoyment of such materials and his persistent use of them, when given free choice, indicate that they offer to him an opportunity for interesting experience.

When the "Limber Elf's" mother offered her a glove to hide under, the child was unable for some time to free herself from the suggestion that adequate space would then be available.<sup>19</sup> The child's delight in tiny things, on the other hand, gives a hint of clear appreciation of relative size.

A preliminary to the development of number concepts is found in the formation of "series in space," offered by such occupations as fitting pegs into holes in peg boards, piling blocks, stringing beads.

Development of perception of spatial relationships depends not only upon an appreciation of the relative position of movable objects to themselves and to each other but also is involved in that relationship of the individual to his environment which we call orientation in space. Ability to find one's way about differs greatly, from the individual who has so excellent a "sense of direction" that he can always go directly to his destination, to the individual who seems to have no facility at all in recognizing the clues to his position.

F., who is almost four, swings himself, chanting, "I go forward and backward," indicating that he has grasped the idea of change in bodily position as a matter of position in space.

When he was nine years old Rufus Jones says<sup>20</sup> that he planned to organize the boys of his neighborhood into a firm who would dig up the empty cellars (of the burned village) and sell them in small pieces as post holes. Before long he discovered that space cannot be parceled out and nor can sections be transmitted "over into other spaces, because those other spaces are already space."

Some two year olds look directly toward an airplane when they hear its characteristic sound; others look all about the sky until they spot it.

In comparing the ability of children of various ages to judge which of a pair of wooden cubes was farther away from him Updegraff<sup>21</sup> found that the words "nearer" and "farther" were part of the working vocabulary of all the six-year-old children tested, were recognized by the majority of four and five year olds, but were understood by none under three. Farther is understood, however, before nearer.

### THE SELF

Integration of bodily sensations which in the beginning of the individual's experience were discrete, isolated, give rise to the notion of personal identity. The child's perception of his own body comes through the external senses and by means of a mass of organized "systemic and motor sensations from within the body." All these "sensations and ideas which refer to his own body and its activities combine into a general *self-perception* or *self-feeling*. This is not a 'notion' but a sensory experience."<sup>22</sup>

Through memory and through familiarity of repeated experiences a notion of continuity or permanency is built up. The immediacy, vividness, and intimacy of the sensory experiences which underlie this notion of personal identity make it almost impossible for the child to grasp the notion of cessation of personality—death.

It is difficult to preserve a sense of the vividness of any existence in which we do not participate. The friends we have visited and their home and town lose intensity and clarity of outline as they recede in time and space. This process is probably related to the shift in our own personality according to our situation. The "self" in one group varies greatly from that in another. Akin to this familiar experience is that of the child who is quite unable to conceive of the world as existing without him or of his parents except in relation to himself.

Preyer's data regarding the development of this idea of the self, which have been brought together by H. W. Brown,<sup>23</sup> throw into relief this process of integration of sensory experiences and separation of the self from its surroundings.

- 11th week. Child does not see himself in mirror.
- 113th day. For first time regards image with attention.
- 116th day. Laughs at his image.
- 17th week. Joy in seeing image in mirror.
- 17th week. Gazes at his own hand.
- 16th to 17th week. Voluntary gazing at image in mirror.
- 5th month. Discovers that he can cause sensations of sound.
- 5th month. Looks at his own fingers attentively.
- 23d week. Discrimination between touch of self and of foreign objects.
- 24th week. Sees father's image in mirror and turns to look at father.
- 25th week. Stretches hand toward his own image.
- 26th week. Sees father's image and compares it with original.
- 32nd week. Looks at legs and feet as if they were foreign to him.
- 9th month. Feet felt of and carried to mouth.
- 39th week. Skin and legs looked at and felt.
- 41st week. Strikes own body and foreign objects.
- 45th to 46th weeks. Discovery of power to cause changes.
- 12th month. Strikes hard substances against teeth.
- 13th month. Rapping head with hand, finds himself a cause, shakes keys, etc.
- 55th week. Strikes self and observes hands; compares fingers of others with his own.
- 57th week. Looks at image in mirror, puts hand behind glass.

- 58th week. Treats his photograph in like manner; turns away from image in mirror.
- 60th week. Recognizes mother's image in mirror as image.
- 61st week. Tries to feel image in mirror.
- 66th week. Strikes at image in mirror.
- 67th week. Makes grimaces before mirror; turns around to see father whose image appeared in mirror.
- 18th month. Recognizes himself as cause of changes.
- 21st month. Laughs and points to his own image in mirror.

The child's concept of his body as distinct from his environment grows slowly. Tiedemann watched an infant twenty days of age beat and scratch his body until it bled. Only after many repetitions did he associate the pain with his activity and therefore learn not to beat and scratch himself.<sup>24</sup> Sully reports that a baby of ten weeks smiled at his reflection with an "expression of pleasure." At first he reacted as to an actual person, trying to hand it things. At another time he tried to look behind the mirror.<sup>25</sup>

"The external evidences that the child is becoming aware of himself as a permanent being, distinct from the objects he knows, the feelings he experiences, and the ends he chooses" may be listed as follows:

1. Treatment of his own body.

Scratching, striking face.

Feeling of feet and toes—experimentation with limbs.

Delight in activity and in ability to do things.

Kinaesthetic sensation. "The muscle sense plays a predominant part in genesis of self-consciousness" (Wundt).

Ability to cause changes in objects in finding himself a cause.

2. Child's behavior toward image in mirror.

3. Feeling of property.

Pride in personal appearance.

Jealousy.

4. Use of pronoun "I."

"The concept of self is not generated but only rendered more exact and definite by speech." The concept, however, is not always present when word is used.<sup>26</sup>

Subjective and objective stages in the development of the self-feeling are distinguished by Warren. In the objective stage the child's "own personality stands in the same footing as that of other human beings"; he calls himself "Baby" or uses his own

name to refer to himself. In the second or subjective stage the child distinguishes between the notion of self and of "human beings." He no longer refers to himself by name but begins to use pronouns. The third stage in the growth of the "self notion" is found in the child's discovery of personality like his own in other human beings, in animals and even in objects. This Warren calls the "*ejection* of our self-experiences into others."<sup>27</sup>

Mark Baldwin makes an interesting remark with reference to the growth of self-feeling: "My sense of myself grows by imitation of you, and my sense of yourself grows in terms of my sense of myself. Both *ego* and *alter* are thus essentially social; each is a socius and each is an imitative creation."<sup>28</sup>

The child whose development of self-feeling is still in the first stage resents keenly any attempt to deny his selfhood. S., three years old, heard the children counting the number of boys at the table, saying as they pointed to one after another, "He's a boy, and he's a boy, and he's a boy." When the finger of the counter was directed toward S., he grew angry and said, "I'm not a boy, I'm *Stephen*." Yet he could answer correctly the Binet question, "Are you a boy or are you a girl?" After his teacher had several times repeated quietly to him, "Yes, you are Stephen and Stephen is a boy," his face finally relaxed and he murmured to himself, "Stephen, boy; Stephen, boy."

A mother said to her three-year-old son, "H., will you take care of my boy?" "Who is your boy?" "You are my boy." "No, I am myself, and people can't take care of themselves."

The clear distinction between himself and what is not himself requires a great deal of experience. Some of the experiences necessary lie entirely within himself, such as free movements of arms and legs; some are partly within and partly without his control. Out of this variety of experience the distinction between the self and the not-self emerges.<sup>29</sup> It is by means of his resistance and his overcoming of objects and of people that he perceives himself as distinct, an individual.<sup>30</sup>

The development of the concept of self involves the gradual discovery of the child's own body and also the distinction of himself as unique, separate from all other persons or objects. This distinction is in itself a social one. A third phase of this process comes by way of ownership of objects; he "learns to

differentiate himself and his possessions from other persons and the things that belong to them."<sup>31</sup>

Younger children in a nursery school tend to know their own clothes when they are new or startling, even though they do not always recognize their old clothes as *theirs*. The sureness with which children of three know the ownership of garments other than their own is amazing. Often when an adult asks another, "Whose cap is this?" a child near by responds with the correct name. Children recognize the pictures of other children in the school more quickly than they do their own. A series of kodak pictures will be named correctly, with no hesitation except when the child is shown his own picture. Even for an adult it is often difficult to identify his photograph with that much more familiar and intimate self built up of kinaesthetic and organic sensations.

The accumulation of objects, frequently of no intrinsic value, and the intensely possessive attitude toward such a miscellany are expressions of this feeling of personal uniqueness and at the same time means for its extension.

Anything he finds desirable *belongs* to the child. It is his consciousness of himself as an individual entity that prompts self-assertive acts. In turn, such behavior extends his concept of self.

As the child distinguishes himself not only from the environment but from persons as persons, his feeling for possession, his perception of his own property rights increases. "Mine" becomes an important word in his vocabulary because it expresses for the child both the notion of ownership and the notion of his personal identity as owner. Consequently he resents interference with his possessions as interference with his identity. The intensity of his reaction is shown by angry words or by snatching. When considered in this light, such behavior ceases to be "selfishness" in the colloquial sense and becomes merely a step in the process of development toward Warren's third stage.

It is difficult for the young child to comprehend the use of the possessive pronouns *my* and *mine*, by others. Words of self-reference he understands when he speaks them but not when he hears them. When J., three years of age, says "My mamma went down town," S., also three, angrily replies, "No, she's not,

she's at my house." When S. says, "My boy is John" (that is, my brother is John), S. retorts, "No, he's not, he's Bud" (that is, his brother). Each understands "my mother" or "my brother" only in terms of his own relationship to particular individuals. S., at three, is unable to understand those words in terms of a similar relationship in the experience of another, but R., at four years, is beginning to appreciate that each can use me and mine with reference to himself and also to understand the comparable relationships.

When Bulwer-Lytton was eight years old, he is reported to have said after some metaphysical reading "Pray, mamma, are you not sometimes overcome by the sense of your identity?" Younger and less precocious children than he appear to be completely absorbed in the experiences of the me and mine that give rise to a sense of their own personal identity.

After the child has acquired a degree of skill in handling the ideas of his own and of others' identity, he begins to play with them by pretending to be something or some one else. The game of "let's pretend" owes part of its popularity, at least, to the illusion of freedom of movement and of variety of experience. The three year old gets a great deal of pleasure out of making believe that he has shifted his identity. He calls himself Santa Claus or by the name of a young friend and uses his own name only when another person calls him by his assumed name. Mothers of nursery school children report that at home they are put through the entire routine of the nursery school day. The child assumes the rôle of the teacher and demands that his mother play the part of the child, that is, himself. During a period of weeks A., when called by his own name, always reminded the speaker with dignity, "I am Mr. Bolinkus."

One day F., aged three, said to her teacher, "Miss X, where is Miss X?" giving every indication of a humorous play with ideas. When her teacher replied, "The answer to that is, 'Frances, where is Frances?'" F. was puzzled for a moment but, catching the idea, even though she was unable to carry it out completely in the third person, replied, "Frances is at home with *my* mama."

A two year old's constantly repeated remark, made to one adult after another, "I'm Donald," puzzled the staff until the mother, in reply to a question, said that she was in the habit of



saying to the child, "You're a little old bunny," or "You're a no 'count." To such remarks he replied, "No, I'm Donald," insisting on the recognition by others of his identity, of its worth.

A well-tempered idea of the significance, the powers, and the limitations of the self is essential for a wholesome attitude toward life. Consequently the child should be allowed freedom to experiment with his own limitations and powers and those of his environment, to overcome obstacles, to compete with his fellows, to excel and to fail, to defend himself, to protect others.

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## CHAPTER XX

### MASTERING THE TECHNIQUE OF ADULT RESPONSIBILITY

The phrase "finding oneself" has long been used to describe the procedure by which the immature becomes mature. This process of growing up is not confined to the years called adolescent but begins at, and is a continuous process from, birth. Traces of immaturity persevere, however, and crop out persistently in the adult.

Compared with the child the adult is the possessor of greatly extended powers. As the child's capacities develop there must occur during the same time an organization of these new-found powers. In proportion as this organization proceeds satisfactorily or unsuccessfully the child's possible development into adulthood is furthered or retarded.

### CHARACTERISTICS OF MATURITY

Many definitions of maturity have been formulated. Primarily maturity is physiological—the attainment of adulthood in size and in bodily function. This description of maturity is incomplete in that it leaves out of account the psychological aspects—capability and readiness to assume adult responsibilities, to fulfill adult obligations.

"To be considered adult, grown up, mature, the individual must find his place in the world about him. He must know his environment and master it so that he can mold it to his own purposes."<sup>1</sup> The same author defines growth in terms of an increasing capacity to react independently and an opening up of a new field of investigation in the world about him.

The socially acceptable person of college age is defined as "one who is personally clean and healthy, well liked, able to work with his friends or acquaintances or even" with people who

personally are "unacceptable to him, able to make a creative adjustment in any group, and able to be happy."<sup>2</sup>

Hollingsworth<sup>3</sup> holds that finding the self involves the management of desires in the establishment of a "hierarchy of desires." "The emotionally mature person is capable of *gradations* or *degrees* of emotional response," of delaying his response, of fortitude.<sup>4</sup> The adequate adult is capable of sustaining himself physically, he arrives at his own conclusions, he is not dependent upon constant advice or admonition, he is independent of coddling, and has formulated his point of view on life.<sup>5</sup> This describes an ideal for adult development rather than the average adult of everyday acquaintance.

Another trait that marks the adult, is open-mindedness—the ability and the willingness to consider a question from various aspects. The insidious danger inherent in prejudices is that it is so difficult to recognize one's own prejudices, for to one's own mind they appear to be unavoidable conclusions, the result of open-minded consideration.

The individual who is completely open-minded, however, is the person who has no convictions. The line between conviction and prejudice is a delicate but significant one, for it distinguishes between logical thinking and emotional attitude. It is possible to support any conclusion by arguments *a posteriori*. To scrutinize conventions and prejudices is exceedingly difficult by reason of their intimate connection with one's general attitude toward life.

Respect for and appreciation of the attitudes and convictions of other people involve a willingness to accept new information and evaluation of current opinion. There is a temptation to endow the word adult with a meaning synonymous with perfection.

According to Anderson,<sup>6</sup> a successful adjustment to an adult level is largely a matter of selection from among responses. "Character, sanity, personality are not accidents but are achievements attained through a struggle between conflicting modes of response which begin at the cradle."

"The adjusted personality, with the life of impulse and the life of reason in adequate balance, has attained a position from which flows tolerance and understanding." "The personality

with inferior inhibition" finds it difficult to appreciate the struggle of others.<sup>7</sup>

For the child deferred objectives have little or no existence; it is literally now or never with him. With approach to adulthood comes an increasing facility to pursue remote ends, to set goals which can be achieved only after long and perhaps arduous effort.

Proficiency in inhibiting responses, in exercising rational control while retaining spontaneity and wholehearted responsiveness to the situations of daily living, is another aspect of the adult attitude. The activity of the young child is characterized by diffusion of response, involving to a greater or less degree the whole body. As maturation advances there is an increasing specificity of response so that energy is directed toward those muscles which are directly involved, and other movements are in large measure inhibited. In like manner intellectual and emotional behavior is increasingly specialized. Random activity and diffuse responses give place to purposeful activities.

Endurance, fortitude are essential to a comfortable existence. According to Scott, endurance "is a question of the chronic state of man's inner thought and imagination." The person who has had an interesting and happy childhood is "practiced in the art of extracting happiness from the world," he has acquired skill in drawing "interest and happiness" out of the situation in which "he may find himself."<sup>8</sup>

Through experience the child learns to do the things that meet the case, to limit his behavior to those acts that are pertinent to the immediate situation. This perfection of controlled and effective behavior is, of course, never attained. Throughout any individual life there are outcroppings of the diffuse, over-inner-vated behavior characteristic of childhood.

Yet childhood is valuable as a progress toward maturity. Perpetuation of childish attitudes and methods of behavior, legitimate when occurring as the result of a given stage of development, becomes a handicap when perpetuated or prolonged into older years or when magnified by connection with a body of larger size.

The assumption of those attitudes and manners which are called adult is one of the goals of development and learning.

Perfect conformity to a standard of behavior tarnishes that uniqueness of personality which is the inevitable accompaniment of the final and unapproachable isolation of every human being.

Secluded as the individual of necessity is, he is at the same time dependent upon the group in which he finds himself. The person as his contemporaries know him is the resultant of this combination. Yet each individual takes himself as the standard of measurement in estimating the other members of his group. Fortunately for both adult and child the group varies, changes, is partly selected and partly imposed by circumstance.

#### DIFFERENCES BETWEEN CHILD AND ADULT

The psychological distance between child and adult is neither so great nor so uniform as was at one time supposed. Much of so-called adult behavior partakes of childish characteristics. That a continuing development during the years of growth is desirable all would agree. Although a tendency to grow and to develop characterizes childhood and youth this development is molded by the situations to which the child responds or refuses to respond.

The earlier doctrine that the "ultimate aim of child training is maturity" has been tempered by an appreciation of the importance of childhood in and for itself and by a recognition of the fact that maturity is the result of a process of growth rather than an entity achieved suddenly and completely.

"Childhood is but change made gay and visible," says Mrs. Meynell and goes on to remark that two hundred years ago childhood was borne with. Our forefathers valued change for the sake of its results and therefore hurried childhood. Now that all things are "found to be on a journey," childhood seems "at last something else than a defect."

Constantly, throughout the period of growth there is change. The infant type approaches the adult type. The adult physically and mentally is the resultant of growth and of experience. In order to see the child clearly a brief summary of some of the bodily differences between adult and child is of value.

Growth takes place through cell division, the enlargement of cells produced by this division, and differentiation of these cells. Barring accident and disease, the growth of each individual seems

to follow a given course, an inherent growth impulse; animals small at birth at maturity are apt to be below normal size. Long babies may be expected to develop into tall adults.

In measuring the growth of fetuses, Scammon<sup>18</sup> found that weight increases very slowly with length in the younger specimens, while in the older ones there is an increasing weight for length extending to the time of birth. Weight increases at the rate of 1 per cent per day during the last month of fetal life. Were this rate of growth continued until the end of the first year, the weight of the body would be nearly 200 pounds, and were it to continue to twenty years, the volume of the body would approximate the magnitude of the earth. After birth, until the age of two, there is a period of extremely rapid growth in weight. Slowly this rate decreases. From two to ten years the rate is slow and constant. Then between ten and eighteen comes a third period of rapid growth in body weight.

In body composition itself there is marked contrast; for instance, the fetus is composed of 97.5 per cent water; the infant at birth, 74.7 per cent; and the adult, 58.5 per cent.<sup>10</sup>

There are important skeletal differences between adult and child. During the first year after birth, the spine changes from the "single slightly dorsally convex curve to the normal compound curves at a year of age when the baby assumes an erect posture." In infancy the range of movement of joints is greater than in childhood.<sup>11</sup>

An outline of body form of adult and child not only reveals the physical disparity but serves also as a figure of the psychological differentiation. The rate of development diminishes with age. It must always be borne in mind that there is a continuing process of development from conception until maturity. At any point the individual functions as an entity which is valuable in and for itself as well as serviceable for an end beyond itself. The child is not merely a diminutive adult differing in details of small size, lesser strength, a narrower experience—he is a different person.

Ferris summarizes relative size as follows: the "same proportionate weight of the skeleton, fat, and skin, which is about 39 per cent of the total weight of the new-born, persists in the adult." In the newborn, relative weight of the organs of ali-

mentation, respiration, and circulation is about twice as great as in the adult. As compared with the adult, the relative weight of the muscles in the newborn is one-half as large while the central nervous system is eight times as large relatively as in the adult. He goes on to suggest that the nervous instability of childhood may be due at least in part to the rapid growth of the brain.<sup>12</sup>

Proportional size of bodily organs varies greatly. Instability marks both rate of growth and location of increase rather than a gradual and equable increment. "The purely provisional character of young growth forms is so evident, that all doubt about their unstable equilibrium is set at rest."<sup>13</sup>

As a result of differing growth rates in the various parts of the body, "the head and upper parts of the body become relatively smaller while the lower parts become correspondingly larger."<sup>14</sup>

Growth is a "function of time and mass," yet the growth of individual parts varies markedly in both time and rate from the growth rate of the body as a whole. At the same time that the growing individual is increasing in length and bulk, "there is a functional differentiation, equally intricate and diverse." Through use, the growth of tissues is stimulated.<sup>15</sup>

The greater pliability of the child's body is due to his smaller proportion of muscle tissue and his greater proportion of tendon. Difference in composition of tissue and in proportional amounts is characteristic of youth. His bones are more cartilaginous and therefore more pliable and less brittle. Due to the greater proportion of cartilage and fibrous tissue, the softness of tissue, the young child is peculiarly liable to deformity.

For the adult, food must supply needed energy and provide for the repair of body tissues. For the child, food must do these two things and, in addition, provide for growth. The child uses only part of the energy derived from food for growth. "When reckoned per unit of body weight, an infant requires three times as much food energy as does an adult."<sup>16</sup> A caloric excess of 10 to 15 per cent seems to provide for adequate growth.

In the child there is greater body surface in proportion to body volume or bulk. He is therefore more sensitive to changes in temperature. Since the radiation surface is so great in propor-



tion to body size, he needs more food to compensate for the readiness with which heat is lost. So it comes about that the radiation of heat is greater in the child. Respiration is more rapid, and carbon dioxide excretion is higher. Thus the greater activity necessary for growth is made possible.

Body proportions differ. At birth the upper extremities are relatively long, the legs relatively short. As compared with the adult proportion, in the child total height is four times that of the head; in the adult, eight. The arms and legs are equal in length in the child, but in the adult the legs are longer than the arms. The head doubles in height, the body increases to three times, the upper limbs four times, and the lower five times that of birth length.<sup>17</sup>

Relatively, the infant's head is much larger than the adult's; proportionally, about twice as large; and absolutely, about half as large.

Viscera increase in much the same fashion—rapid growth in infancy is followed by a period of steady but slow increase during childhood. This is succeeded by the rapid rate of the prepubertal period. In the early part of the developmental period the nervous system, including brain, spinal cord, and the organs of the special senses, grows rapidly and early attains the major portion of its total size. At birth the brain is only one-fourth of its total size, at eighteen months it is over half, while at the age of six years it has reached nine-tenths of its complete development. As a whole, the body weight increases twenty-fold between birth and maturity. From time to time the location of growth activity shifts. The most active region of growth is first in the head region, second in the trunk, and finally in the limbs.<sup>18</sup> Due to the incomplete development of the jaws, the face is smaller in infancy, both relatively and absolutely. In the infant, arms and legs, especially the latter, are proportionally shorter than in the adult.

"Imagine, for a moment, an edentulous adult with a head one-quarter the length of his body, whose legs represent but another quarter, and whose liver was about twice the normal size." The vault of the skull, instead of being a perfectly rigid box, consists "of thin bones, movable one upon the other, with spaces between the adjacent bones through which the pulsations of the brain" can be felt.<sup>19</sup>

The differences between child and adult may be thus summarized:

1. The child is a growing animal.
2. Surface of the body is relatively larger in proportion to bulk than it is in the adult.
3. Digestive processes differ in that (a) the absence of teeth necessitates liquid food; (b) starchy foods cannot be digested because salivary glands are not fully developed.
4. Greater activity of circulation. This is indicated by the relative rapidity of the pulse; the younger the child is the quicker his normal pulse rate.
5. The type of breathing as well as its rate is different—rate of respiration is quickest at birth, gradually diminishing till puberty. Abdominal type of breathing predominates.

Scrutiny of the drawing of infants and children by the Primitives reveals the difference in body proportion of infant and adult. Leonardo da Vinci was the first artist to grasp the actual differences and to comprehend that the body of the child is not merely a reduction of the adult body but, on the contrary, differs in proportion.

The physical differences between child and adult are accompanied by equally marked psychological differences which have been discussed in previous chapters. Active appropriation of his environment characterizes the child psychologically. Through such active appropriation he learns to manage himself in his environment.

### THE CHILD NEEDS PRACTICE

The child learns most readily when he has an opportunity to try his fortune, to explore the setting in which he finds himself. In so experimenting he finds that there are forces which operate with no consideration for, or deference to, his wishes. One of the essentials of the technique of adult responsibility is skill in reshaping one's desires to conform with those forces that are beyond one's control. This may occur through an enlargement of the child's insight into the resources of the situation, the varieties of possible response, and increased participation therein.

Confusion results when the child must make differing responses to similar situations. This ability to distinguish the significant elements of a situation and to ignore the non-essentials requires

considerable practice. Frequently adults expect children to make such analyses and to produce the suitable response and are surprised that the child should fail, forgetting their own long period of practice.

E. was the pivot around which his household revolved. His mother adored him and found her enjoyment in him, to a large measure. Yet she had come to realize that she was devoting the child to herself. Consequently she was eager that the school make a "social" person of him. At home she taught him to be a solitary, at school he was to be "hail fellow well met." As a result, the child used, while at school, the only means in his power (such as wetting his trousers) to secure the same close bond and personal interest as was his at home without asking. This child was expected to learn at a stroke how to play contentedly at home alone and at school freely with others.

Mastery of the technique of adult responsibility comes as a result of training. Little children quickly learn to recognize responsibilities and so grow up with the idea of accepting and carrying on the share of responsibility which falls to them. Consequently they develop a well-balanced, sane, and wholesome attitude toward themselves and their relation to other people.

The heavy sense of responsibility for events beyond a child's control, which comes from too early and too great an assumption of adult obligations, is to be avoided. It is not necessary, however, to go to either extreme; there is a middle ground which makes possible growth in capacity for assuming responsibility through opportunity for practice.

In a consideration of learning, emphasis is naturally placed upon the process by means of which this goal is to be reached. The contributing factors are growth and development, maturation, experience.

The child's development of adult skills is hindered whenever he becomes the plaything of an ever attentive parent who makes him aware that he is the constant center of interest. Such a child is trained to measure the effects of his actions in terms of the sensation he creates rather than in terms of achievement or amount accomplished. So also is the child whose parent attempts to smooth away all difficulties, to protect him from

conflict of any kind, prevented from that practice in human relationship that is necessary for the development of adult responsibility.

To choose between possible courses of action, to select from several opportunities one which seems of greatest value, is a human characteristic. Choice, however, in any one instance rests upon preceding choices; decision is swayed by emotion and in turn determines decisions which follow. The human being seems never to give up hope that the consequences of a given choice may be avoided, but while such consequences may at times be counteracted or compensated for by effort or suffering or intelligence these means of compensation in themselves are limitations of freedom of movement.

If the child is spared the opportunity for experience—the consequences of his choice—he learns to expect some beneficent force to intervene in protecting him. Because the child may set into motion forces which are out of proportion to the seriousness of his offense, adults tend to protect him, to shield him even from the knowledge of the consequences. More rarely the adult intercepts the child's enjoyment of fortunate consequences. Appreciation of one's possible powers as instrument in producing future results comes through learning that one must accept the responsibility for one's acts.

Self-expression is valuable only in so far as there is a self to be expressed. It is not of value for its own sake or as an end in itself. Even with this restriction self-expression has its own limits. Realization of the limitations of one's own energy, originality, and ability need not necessarily destroy the desire to increase the richness of one's experience. The technique of the mastery of adulthood is found in the freedom through conformity which recognizes limitations. Such recognition, however, need not imply a malign fate but rather the identity of the individual with the human race.

Dependence upon the group for physical survival is greatest in infancy, since then the individual is unable to fend for himself. Psychological independence is rarely, if ever, achieved. Even that turning away which characterizes the behavior of the hermit or the misanthrope is a sort of inverted dependence—his negation of need is, in a sense, an affirmation.

Yet in the final analysis, each individual is alone and unapproachable. This isolation is the inevitable penalty of the uniqueness of each individual. Another concomitant is the tendency of each person to take himself as the standard of measurement; each can judge others only in terms of himself and his own attitudes. The development of sympathy, of capacity to understand other people, of tolerance requires an opportunity for practice and for many individuals rests upon direct teaching.

A clear distinction between living and inanimate things is slow in coming. It has been suggested that although the baby in all probability bestows his smiles as frequently on lifeless things as he does on human objects, it is only the latter who return his smile. Response serves as stimulus to call forth further smiling. There are other objects, however, such as balls which move readily and therefore seem to possess a life of their own. There are other objects which are especially dear such as dolls. These also may be endowed with life. Confusion between the animate and the inanimate persists for some time. Even after the child knows the distinction, he may in practice confuse the two because the vividness of his own experience lends a lifelikeness to the inanimate object. He hits the wall into which he bumps or kicks the chair over which he stumbles. A more charming example of the childish animism is that of Jean Ingelow, who transferred stones from one spot to another so that they might enjoy the change.

Development from a state of complete helplessness to that degree of comparative independence which is called adult is accompanied by a changing concept of the growing individual's maturing powers. Many of the clashes between parent and child are due to the fact that this concept differs so greatly. The child's attention is fixed on his increasing powers, while the parent's attention tends to be directed toward the immaturity of the younger person. For both adult and child a growing, changing conception of this relationship is necessary. One difficulty underlying this situation is suggested by the following quotation: "She's going to have a boy sure as you know. . . . And it came on me how all those months I was so busy watching myself and thinking of myself I almost forgot that it would be a baby, a real person."<sup>20</sup> "And I wondered what I was working so hard for, what I worried about so much for the children. . . . I

couldn't understand how all of a sudden they were four different people. Always they were just a part of me . . . after they were born they were only just things that happened in *my* life and now here they were and they weren't a part of me at all. They were four people like me with lives of their own and things happening in *their* lives."<sup>21</sup>

Freedom of attack, utilization of the materials at hand, delight in sensations, perception of relationships and differences both in reaction and in the elements of the environment—all these enrich the life of the child and may continue to function in the attitude of the adult. It is through play that the child develops a freedom in the management of the material resources and of the intangible personal relationships in his environment. The zest with which he attacks the situations in which he finds himself is one criterion of his healthful, normal development. The dying down of this zest becomes a limitation of adult activity. "Life tames all of us" was said by an old gentleman to whom wisdom had come through experience. This process of taming is due in no small measure to the necessity for assuming adult responsibility which involves direction of activity along previously determined lines. It was the genius of Isadora Duncan which enabled her to coordinate in any degree at all this freedom of expression which marked her as a child dancing on the lawn with the art by means of which she gained her own livelihood.

The playboy refuses to accept adult responsibility even after he has reached years of maturity but, on the contrary, continues to live in the freedom of the moment without reference to past or future. Freedom from the burden of being responsible for an integrated existence, an attitude of joyful abandon in the moment, are not altogether to be despised, however. It may be that the ant and the grasshopper of the fable would each have profited by a mutual exchange of ideas, a tempering of each other's attitudes.

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